PROPOSAL FOR SURFACE REMEDIAL ACTIVITIES AT

WESTERN PROCESSING KENT, WASHINGTON

PREPARED FOR
WESTERN PROCESSING
COORDINATING COMMITTEE

JUNE 26, 1984

SUBMITTED BY
Chemical Waste Management, Inc.
ENRAC Division

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EA0423

Revision No. 1

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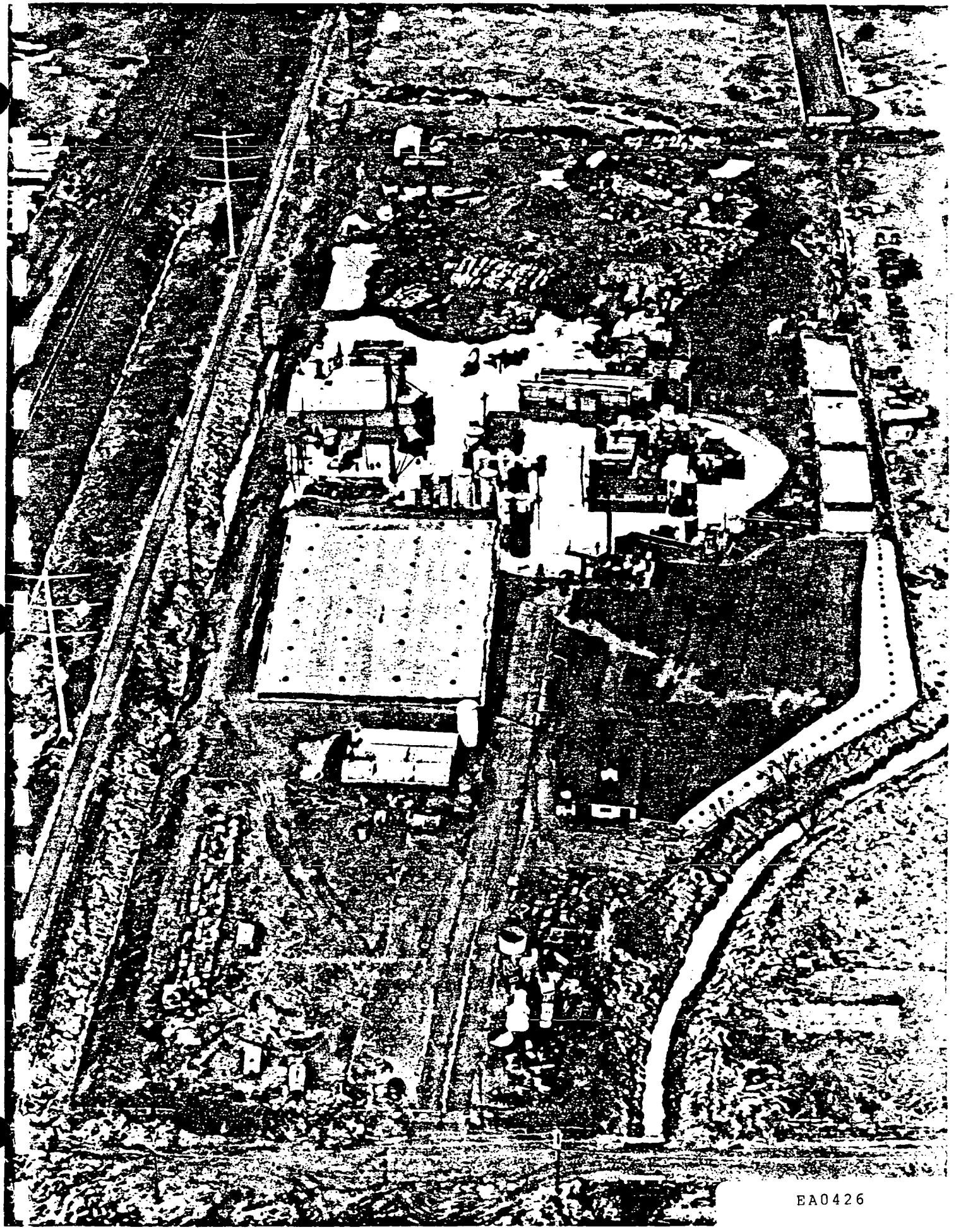
SECTION I INTRODUCTION

Western Processing, Inc., located in Kent, Washington, operated as an industrial waste recycling facility since 1957. The facility occupies approximately 13 acres upon which there is a small laboratory, a solvent recycling plant, a fertilizer plant, bulk storage tanks, drum storage areas, piles of flue dust, construction debris, and a large cement block above ground storage lagoon previously used for liquid wastes, cooling water, and process water. Mill Creek, also known as King County Drainage Ditch #1, runs across the northwest corner of the site from south to north. The Kent Bicycle Trail occupies a former railroad right-of-way along the eastern boundary of the site. A high voltage power line and drainage ditch also run along the eastern boundary. Beyond these, to the east, is the Burlington Northern Railroad. Access is from South 196th Street along the northern boundary. (See Photograph)

The site lies in the flood plain of the Green River. The area is very flat, with an average elevation of approximately 20 feet above mean sea level.

In October 1983, the Washington DOE initiated a project to control storm water infiltration and runoff from the site. This project included limited excavation, paving, covering and berming approximately two acres of the site in an effort to prevent winter rains from increasing surface and groundwater contamination. The project, which cost approximately $400,000, was completed in mid-November 1983.

Chemical Waste Management, Inc. (CWM), through its Environmental Remedial Action Division (ENRAC), has developed the following Technical Proposal for remedial activities at the Western Processing site in Kent, Washington. The technical approach detailed in the following sections presents a project that effectively addresses the hazardous conditions at the site, and which is safe, environmentally sound, and cost-effective.



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SECTION II SCOPE OF WORK

Based upon the careful review of the information presently available regarding the site conditions at Western Processing, Inc., Kent, Washington, Chemical Waste Management, Inc. (CWM), through its Environmental Remedial Action Division (ENRAC), has developed a Scope of Work which establishes the basis for a comprehensive operations plan necessary for surface mitigation activities at this location. The intent of the following Scope of Work is to outline the key functions and tasks necessary for the safe and orderly removal, transportation, treatment and/or disposal of the various surface materials present at the Western Processing site. The site specific tasks incorporated in ENRAC's Scope of Work are generally presented below and are covered in greater detail in the sections of this Technical Proposal that follow.

- Site preparation to provide for support and decontamination facilities; establishment of "clean" zones including appropriate access roadways; and placement of a mobile analytical facility.

- Initial analytical survey and characterization of liquid and solid materials identified for removal off-site.

- Removal of all bulk liquids and/or treatment and removal of bulk liquids for disposal and/or treatment at a permitted off-site facility. The volume of on-site bulk liquids in tanks is calculated to be 450,000 gallons.

- Consolidation of compatible drummed liquids for removal in bulk for treatment and disposal at a permitted off-site facility. Based on the defined quantity of 55 gallon drums containing liquids, the calculated volume of these materials is 77,000 gallons.

- On-site volume reduction of emptied 55 gallon drums for transportation to an off-site permitted disposal facility. The calculated quantity of emptied drums is 5,400.

- Removal of all on-site waste piles to a permitted off-site facility. The piles to be excavated and removed include, but are not limited to, previously excavated and piled "gyp" pond materials, battery chips and fragments, and the waste piles at the southerly portion of the site consisting primarily of steel manufacturing slag and flue dust.

- The earthen berm along the Eastern perimeter of the site will be removed except that sufficient berm to prevent surface water runoff to the east shall remain.

- Each solid waste pile shall be removed down to the existing grade level at the site location on which it is now situated. The exception will be the area on which the accumulated "gyp" pond pile is now situated. Up to 750 tons of soil below existing grade level will be removed in addition to the pile itself. This depression will form a storm water accumulation area for use subsequent to the surface cleanup. Adjacent areas to the south of the accumulation area will be graded to provide drainage to the area.

- All other surface debris (i.e. skids, lumber, bulky solids, etc.) will be removed and disposed.

- Demolition of all on-site building structures and associated internal process and support equipment for removal, transportation and disposal at a permitted off-site facility. There are ten (10) such structures at the Western Processing site. Included are transformers and associated sub-station equipment.

- Dismantling of the seventy-five (75) on-site bulk storage tanks in addition to the three (3) railroad hopper cars and various processing vats for transportation to an off-site permitted disposal facility. If tanks are determined to be structurally sound, such tanks will be thoroughly cleaned and staged in a clean area of the site for sale as scrap metal.

- Collection, identification and packaging of all on-site laboratory chemicals for consolidation as "lab packs" for transportation and disposal at an off-site disposal facility.

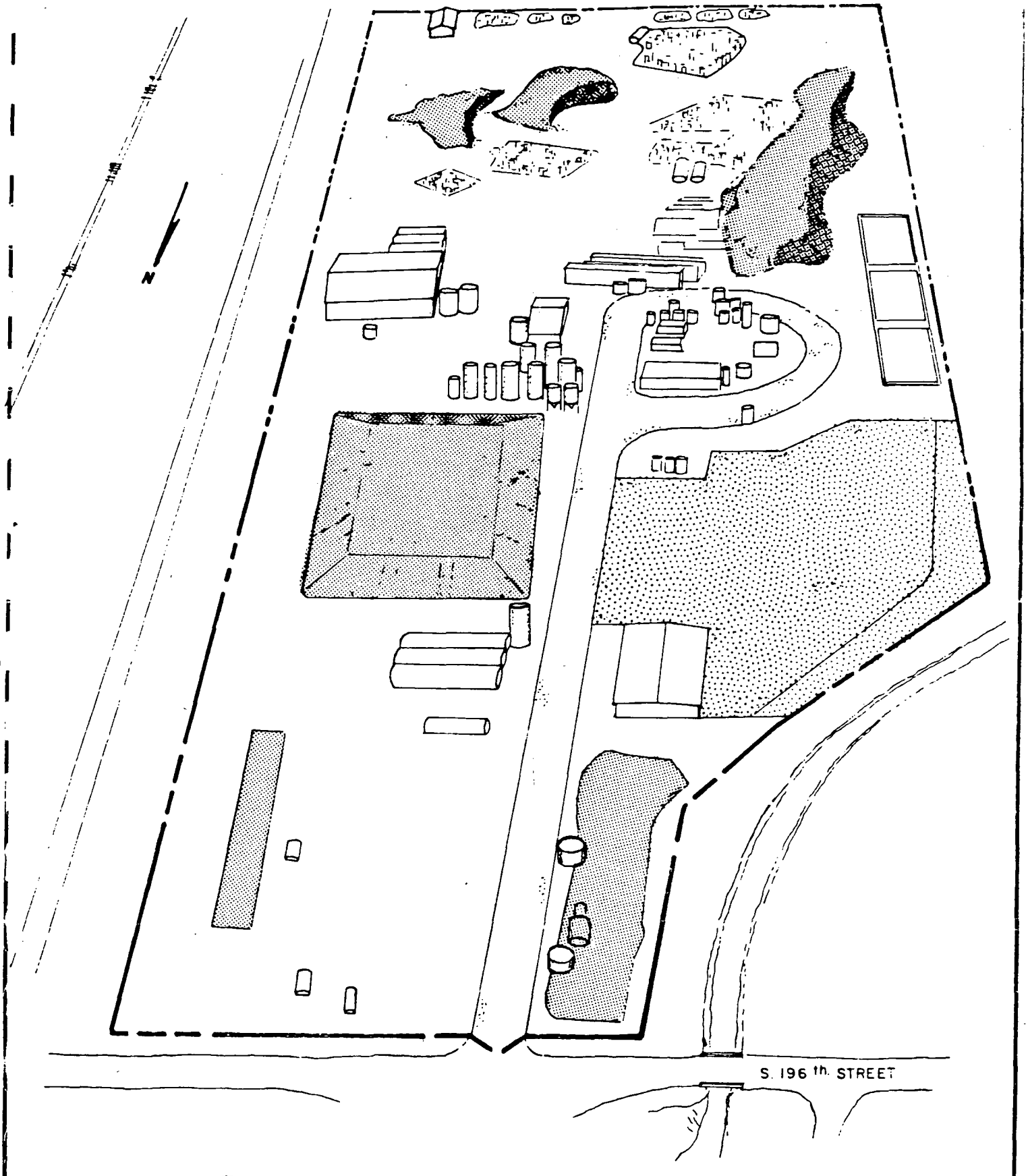
- Repackaging, removal and disposal of all volumes of one gallon and other cans in addition to aerosol containers.

- On-site and perimeter monitoring of air quality during remedial activities.

- Stormwater will be controlled as described in Section 3.13.

- Certain quantities of accumulated and ponded rainwater will be utilized throughout the operational phases of the project for purposes of dust control during excavation/loading operations. In such cases, the rainwater will be transported and disposed of as part of the excavated material.

- Decontamination and removal of support equipment brought to Western Processing by ENRAC and overall site demobilization at the completion of this project.



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CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.

DRWG. NO. EN - 1

SECTION III OPERATIONS

The operations plan which follows addresses in detail each of the tasks which CWM-ENRAC will undertake in the implementation of remedial activities at Western Processing. The plan has been developed to specifically address key factors associated with the project, while remaining flexible enough to be able to be modified to meet changing site conditions.

3.1 MOBILIZATION

During the initial phase of site mitigation activities at the Western Processing site, CWM-ENRAC will mobilize the necessary personnel and equipment to undertake the project safely and effectively with the overall goal of maintaining project scheduling.

Initially, CWM-ENRAC will divide the site into separate zones according to the tasks which will be undertaken in each area, thereby separating the contaminated or "hot" areas of the site from the clean support area. Personnel decontamination facilities, a mobile field laboratory, field command post, security station, lunchroom facility, storage trailers, and other necessary equipment will be positioned in the northern section of the site, within the existing fenced perimeter as shown on ENRAC drawing No. EN-2. Utilities, such as telephone lines, electrical service, and a potable water supply, will be provided.

An integral aspect of ENRAC's on-going operations is the need to monitor and control access to the ENRAC site at all times and specify procedures for emergency situations. CWM-ENRAC will sub-contract the services of a professional security organization which will provide, on a 24 hour basis, a uniformed security officer who will be positioned at the north entrance to the site. The security officer will be familiar with, and abide by the following items to be specifically developed and implemented for this project:

1. General Security Conditions
   - A. Controlling site access
   - B. Logging personnel
   - C. Non-operational hour security
2. Schedule of Operations
3. ENRAC Personnel On-Site
4. Emergency Procedures
5. Specific Responsibilities
   - A. Operational hours
   - B. Non-operational hours

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6. Reporting
7. Rules for Security Personnel
8. Key Contacts and Phone Numbers

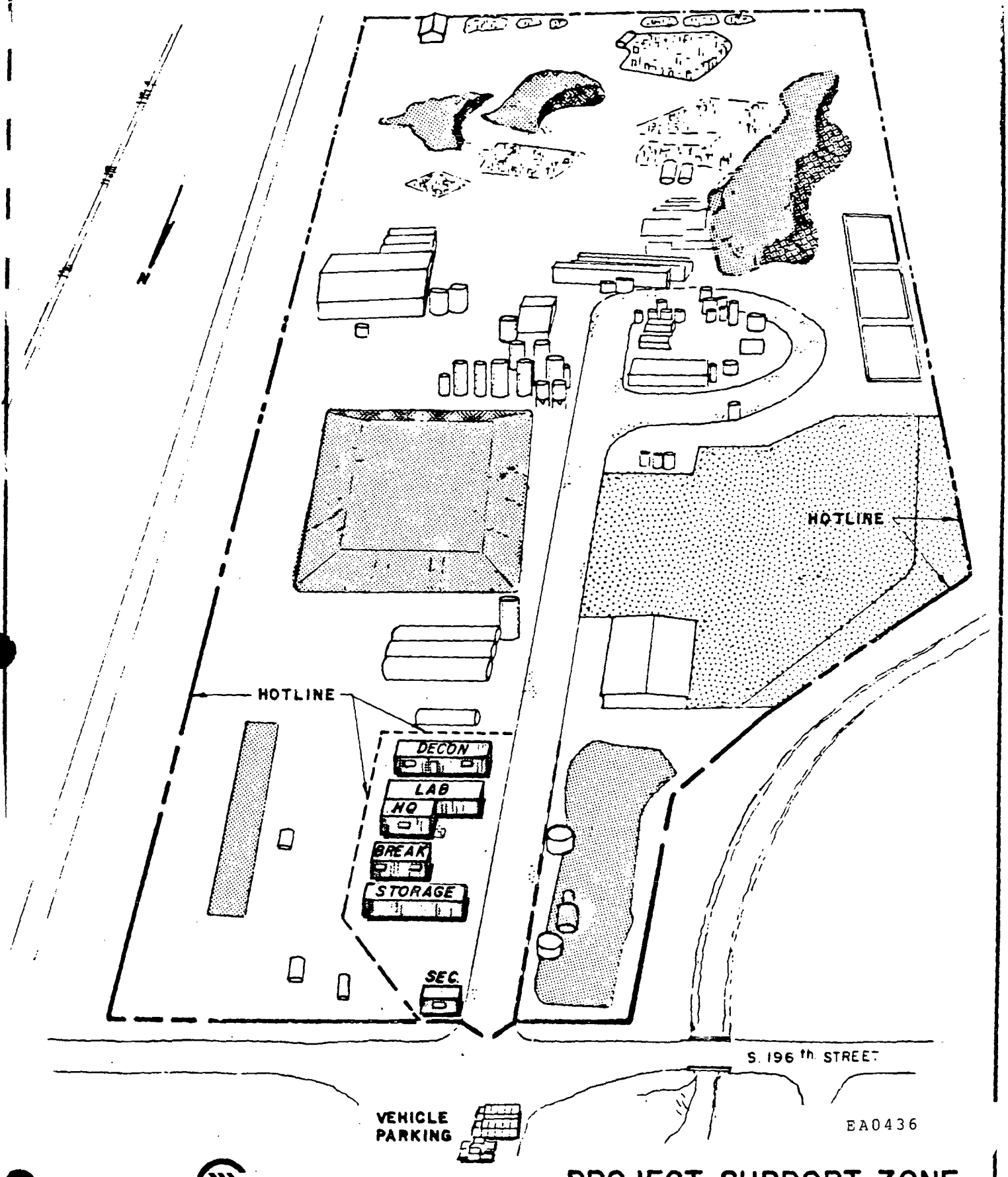
In order to prepare for implementation of the project's waste transportation program, CWM-ENRAC will prepare access roadways on the site which will be used by transportation vehicles during the waste loading portion of the project. A lining and tarping station and vehicle and equipment decontamination area will be assembled at the north end of the site. This preparation will provide for a safe and efficient flow of vehicles through the site while minimizing the potential for the spreading of contamination by vehicles leaving the site.

The final activity to be carried out by ENRAC personnel during the mobilization phase will be those items referenced in the health and safety plan, namely; establishment of off-site air monitoring stations, discussions and project safety reviews with local health facilities and support services, and preliminary site safety training meetings with those personnel involved with the mitigation activities.

Upon completion of ENRAC's scheduled mobilization activities, the actual on-site remedial procedures will commence.

3.1.1 Asphalt Pad

The DOE installed asphalt pad area will be utilized during the surface cleanup by CWM. However, the catch basin drain will be plugged prior to any activity on the pad to prevent potentially contaminated water from entering Mill Creek. Any stormwater accumulated on the asphalt pad during or subsequent to surface clean up will be treated in the mobile wastewater treatment facility and discharged to the METRO sewer. Treated stormwater will be discharged to the METRO sewer by permit or to Mill Creek by permit.



CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

PROJECT SUPPORT ZONE

(ILLUSTRATIVE)

WESTERN PROCESSING KENT, WA.

DRWG. NO. EN-2

3.2 ENRAC PERSONNEL/RESPONSIBILITIES

ENRAC is staffed by thoroughly experienced, degreed scientists and technicians. The select team of professionals who staff our ENRAC division hold degrees in Chemical Engineering, Civil Engineering, Biochemistry, Envir n-mental and Ecological Sciences, Analytical Chemistry and Geology as well as various business disciplines of acountancy, administration etc.

ENRAC PROJECT MANAGER

Remedial actions at uncontrolled hazardous waste sites are under the direction of an ENRAC Project Manager. The ENRAC Project Manager is responsible for:

- Coordination of the activities and efforts of the Operations Coordinator in order to ensure efficient and effective project performance;
- Coordinate and schedule the project (determine when and where to move the crew, ensure that proper equipment is at the site when crew arrives, ensure all necessary details are handled prior to crew moving to site, etc.);
- Assist Operations Coordinator with any on-site problems encountered (make arrangements for additional personnel if needed, additional or alternative types of equipment, operational problems, etc.);
- Periodically inspect the work at the site to ensure proper performance;
- Maintain complete awareness of current status of the project;
- Schedule, specify, and coordinate the appropriate type of equipment needed to perform work.

ENRAC OPERATIONS COORDINATOR

The ENRAC Operations Coordinator will be at the site whenever work is being done. He is responsible for:

- Complete on-site responsibility reporting to the Project Manager;
- Supervising personnel;
- Assigning work duties;
- Assuring proper safety equipment and procedures are used;
- Resolving disputes/problems among personnel;
- Handling day-to-day operational problems involved with the job;
- Assuring equipment is maintained;
- Maintaining log book of clean-up activities;
- Establishing, starting and quitting time (number of days worked per week, etc.);
- Recording all time expended, material and expenses;
- Handling all paperwork (Manifests, Bill of Ladings, etc.);
- Acting as on-site CWM representative for on-scene coordinator;

ENRAC SAFETY REPRESENTATIVE

The ENRAC Safety Representative reports to the Project Manager and is on site whenever operations are in progress.

The ENRAC Safety Representative's responsibilities include:

- Coordinating health surveillance of all ENRAC employees;
- Assuring that safety procedures in effect are in compliance with all appropriate federal, state and company regulations (following the most stringent);
- Maintaining personnel exposure records;
- Assuring appropriate personnel protection equipment is adequate for actual hazards of on-site working conditions;

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- Assuring appropriate hazard areas are identified and well marked;
- Assuring all personnel entering hazard areas are in appropriate levels of protection;
- Assuring that all personnel and equipment exiting hazard areas are properly decontaminated;
- Supervising the establishment and operation of the decontamination area;
- Conducting personnel hazard exposure surveillance using personal air sampling devices, film badges, dosimeters, etc.;
- Conducting ambient air monitoring at the work site and at the downwind edge of the hazard areas;
- Coordinating health emergency plans with local medical authorities;
- Coordinating evacuation plans with local authorities;
- Establishing and supervising first aid station;
- Assuring adequate supplies of personnel protective equipment are maintained and replaced for the operations being conducted;
- Assuring all supplied air equipment is functioning properly;
- Conducting safety meetings with employees;
- Assuring visitors comply with site safety regulations;
- Establishing and coordinating fit testing for all respiratory protective equipment to be used on site;
- Establishing site specific safety procedures for problems encountered on site.

ENRAC ANALYTICAL SERVICES COORDINATOR

The ENRAC Analytical Services Coordinator at the clean-up site is responsible for sample acquisition and on-site analytical work. These responsibilities include:

- Coordinating all activities involving the mobile laboratory;
- Assuring laboratory is adequately supplied and maintained;
- Assuring proper sample acquisition techniques are employed;
- Maintaining sample log book;
- Performing fingerprint test for "generic" classification of materials for compatibility purposes;
- Performing necessary analysis of bulked materials for disposal purposes;
- Assuring quality control of material that is treated or neutralized on site, etc.);
- Assisting Operations Coordinator in identification of potential problem materials from drum markings, labels, general knowledge of packaging, etc.

ENRAC ADMINISTRATION COORDINATOR

The ENRAC Administration Coordinator is on site during operations. The Coordinator's responsibilities include:

- Assuring compliance with all contractual obligations throughout the project.
- Controlling and monitoring of all internal and external documentation.
- Resolving contractual questions.

. Administrating the Quality Assurance Plan.

. Internal monitoring of schedule compliance.

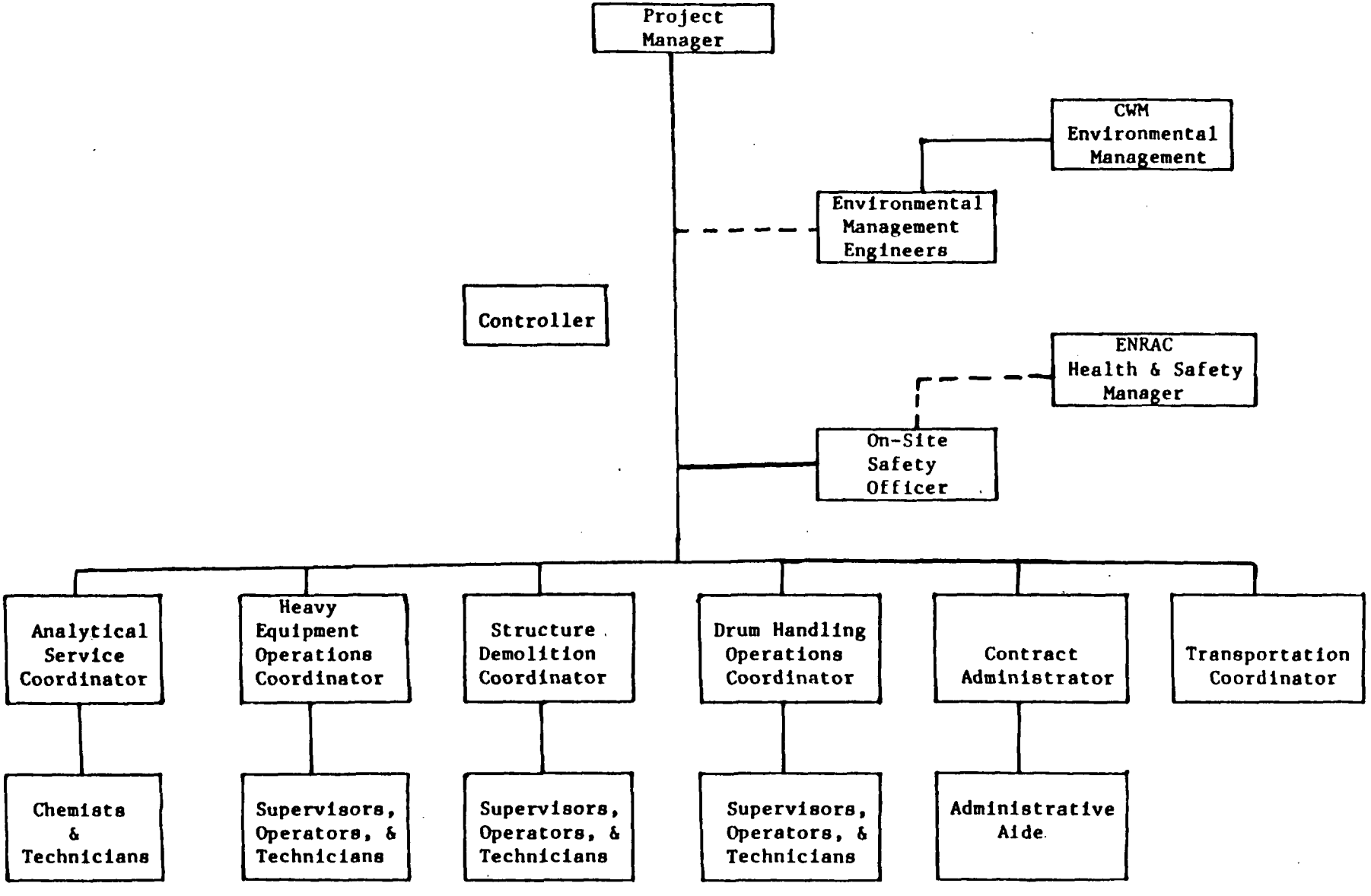
ENRAC TRANSPORTATION COORDINATOR

The ENRAC Transportation Coordinator is on site during off-site transportation operations and is responsible for:

- Scheduling of all transportation requirements.

- Assuring compliance with all D.O.T. regulations.

- Assisting Operations Coordinator in proper completion of manifests.



EA0442

WESTERN PROCESSING

3.3 SAMPLING PLAN

3.3.1 General

CWM-ENRAC will initiate the sampling phase immediately upon completion of mobilization. The sampling phase will be a continuous operation throughout the operational portion of the Western Processing project. The sampling protocol that follows will be utilized as technically required during each of the major tasks to be performed. CWM-ENRAC has combined extensive sampling experience with the recommended sampling methods from the EPA document SW-846 to create the CWM-ENRAC sampling protocol. CWM-ENRAC experience includes the sampling of drums, tanks, tank trucks, tank cars, lagoons, soils, waste piles and bulk solids.

CWM-ENRAC does not intend on conducting analyses on the following categories of materials due to their physical characteristics and the acceptance provisions of the primary disposal facility to be employed for this project:

- Construction debris.
- Demolition debris.
- Demolished bulk tank structures.
- Empty drums.
- Concrete blocks.
- Synthetic liners.
- Miscellaneous debris.

Items and material not referenced above shall be sampled in accordance with the regulatory requirements for acceptance of these substances at the permitted disposal facility.

3.3.2 Sample Identification

All tanks and containers will be marked with a unique identification number which will allow tracking of the samples and their analytical results back to their specific origin. The container number will be marked on the top

and side of the drum using a paint stick capable of withstanding weather and drum condition.

The numbering scheme is simple and controllable. A maximum of 4 digits will be used (0-9999). If additional numbers are necessary, the 4 digits may be preceded by an alphabetic character. This system may also be used to permit multiple sampling crews to number independently. Sample identification numbers are recorded in field log books.

All waste piles will be identified by names such as battery chip pile, flue dust pile, etc. and the location coordinates from which the sample was taken from that pile. These identification numbers will be placed on the respective sample container and will be used for the logging of all analytical results.

3.3.3 Drum Opening Safety

The opening of drums for sampling purposes presents a high safety risk among site operations procedures. This risk includes exposure to currently unknown chemicals, splashing due to pressure built up in drums, and exposure of reactive material to the air. CWM-ENRAC will perform all drum opening operations with non-sparking tools. Personnel involved in drum opening will be outfitted in the proper level of safety equipment as designated in the safety plan. In addition, CWM-ENRAC will perform air monitoring in accordance with the air monitoring plan during drum opening and sampling operations.

3.3.4 Sampling Liquids

The following steps will be implemented for sampling liquids in various containers. Glass tubes will be utilized for the sampling of drummed liquids. The sampling of liquids in tanks depends upon the size, opening and contents of a tank. For smaller tanks, transparent tubing may be used, following the procedures below. For larger tanks, a sampling bomb may be used. Bungs and lids will be replaced and hand-tightened after sampling to reduce rainwater infiltration and volatile emissions.

SAMPLING TUBE PROCEDURES

1) Mark appropriate identification number of sample source and location onto the sample container.
2) Remove cover from sample container.
3) Insert tubing to the bottom of the container to be sampled or until a solid layer is encountered.
4) Allow the waste material in container to reach its natural level in the tube.
5) Cap the top of the tube with a stopper, finger or thumb, using care to prevent contact with the waste.
6) Carefully remove the capped tube from the sample source and insert the uncapped end in the sample container.
7) Carefully release the cap and allow the contents of the tube to drain completely into the sample container.
8) Remove the tube from the sample container and either deposit the tube in a separate container specified for sample tube disposal or decontaminate the tube for reuse.
9) Secure the lid of the sample container.
10) Mark liquid sample containers with an "L".

SAMPLING BOMB PROCEDURES

1) Mark appropriate identification number of sample source and location onto the sample container.
2) Remove cover from sample container.
3) Allow the bomb to fall to the bottom of the tank or until a solid layer of material is encountered and record depth.
4) Open and close the bomb to obtain a sample.
5) Repeat procedure to take samples in the middle and top levels.
6) Carefully remove the bomb from the sample source and release material into the sample container.
7) Place bomb in designated area for decontamination prior to next use.
8) Secure lid of the sample container.
9) Mark liquid sample containers with an "L".

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3.3.5 Sampling Solids

CWM-ENRAC experience has shown that light, dry powders and granular material can be core sampled using a tube. All cored material will be placed into the appropriately marked sample container. Should it be necessary to obtain samples at different depths, the sample core can be split as required. Heavier solids are sampled by trier or shovel by coring with heavy tubing. Waste piles will have sampling grids developed to ensure accurate overall identification of waste contaminants. At least four samples from each grid area will be obtained and composited for analysis. All samples will be placed in sample containers marked with the waste pile name and the sample grid location. Sample jars containing solids will be marked with a corresponding "S".

In the event a sample is unobtainable due to hardness, the corresponding sample jar is marked "SS" (super solid). The on-site chemist will later inspect the drum to determine what sampling and analytical requirements are necessary for disposal site acceptance.

If drums are not to be pumped or crushed, a sample can be marked L/S or S/L to identify the major component in a two-phased drum. On-site treatment of two-phased drums may be necessary prior to disposal.

Bungs and lids will be replaced and hand-tightened to reduce rainwater infiltration and volatile emissions.

3.3.6 Chain of Custody

All samples leaving the work site for further analysis or agency retention will be accompanied by a "chain of custody" document (see Exhibit 3.3.6). This document will trace the movement of the samples from the site to the designated location. This procedure is designed to document and verify sample integrity. The procedure is consistent with USEPA National Enforcement Investigations Center protocol.

EXHIBIT 3.3.6

DISPOSAL SITE REQUESTED

SAMPLE SOURCES
CITY AND STATE

SAMPLE INVENTORY AND MASTER PACKING LIST

SAMPLE LOG NUMBER

Sample I.D.	Total
TOTALS	

CUSTODY SIGNATURES

The persons whose signatures are listed below certify that the collected samples listed in the sample inventory and master packing list above had the samples in their custody and the only manner in which custody was given up was either to one of the other persons listed below or to a locked and/or secured area or chest.

SAMPLER (S)		
	Signature (Print Also)	Date and Time
FIELD CUSTODIAN		

CHAIN-OF-CUSTODY RECORD

CUSTODY SIGNATURES

The persons whose signatures are listed below certify that the collected samples listed in the sample inventory and master packing list above had the samples in their custody and the only manner in which custody was given up was either to one of the other persons listed below or to a locked and/or secured area for shipment.

Courier and/or Commerical Carrier	_____	_____	_____
	Signature of Carrier (Print Also)	Sent To	Date and Time (signed and dispatched)
	_____		_____
Custodian	_____		_____
	(Print Also)		Date and Time
Courier and/or Commercial Carrier	_____	_____	_____
	Signature of Carrier (Print Also)	Sent To	Date and Time (signed or dispatched)
Lab Custodian	_____		_____
	Signature (Print Also)		Date and Time
	_____		_____
Lab Manager/ Director	_____		_____
	Signature (Print Also)		Date and Time

3.3.7 Certification of Representative Sample

Waste materials designated for CWM owned and operated disposal sites will require a Certification of Representative Sample form to be completed. (See Exhibit 3.3.7.1). Each waste stream will require a sample or composite sample to be submitted to the disposal site accompanied by a completed Certification of Representative Sample form. In addition, each individual waste stream will require the completion of a CWM Generator's Waste Material Profile Sheet. (See Exhibit 3.3.7.2). A log for the Generator's Waste Material Profile Sheets will be maintained for internal purposes. (See Exhibit 3.3.7.3). Special consideration should be given to the profile number, date, chemist and the results.

EXHIBIT 3.3.7.1

SALES CODE | D 55801

WASTE PROFILE SHEET CODE

CERTIFICATION OF REPRESENTATIVE SAMPLE

GENERAL DIRECTIONS: IN ORDER TO DETERMINE WHETHER WE CAN ACCEPT THE SPECIAL WASTE DESCRIBED IN THE ABOVE NUMBERED PROFILE SHEET, WE MUST OBTAIN A REPRESENTATIVE SAMPLE OF THE WASTE WE WILL ANALYZE THE SAMPLE TO VERIFY THE INFORMATION YOU HAVE PROVIDED US. SO IT IS PARTICULARLY IMPORTANT THAT THE SAMPLE BE TRULY REPRESENTATIVE. IN MOST CIRCUMSTANCES YOU WILL BE OBTAINING THE SAMPLE. HOWEVER, IN THOSE CASES IN WHICH WE OBTAIN THE SAMPLE, WE MUST ASK THAT ONE OF YOUR EMPLOYEES BE PRESENT TO DIRECT THE PARTICULAR SOURCE TO BE SAMPLED AND TO WITNESS THE SAMPLING. IN SUCH CASE, YOUR EMPLOYEE MUST SIGN THIS CERTIFICATION AS A WITNESS

THIS CERTIFICATION MUST BE RETURNED, WITH THE REPRESENTATIVE WASTE SAMPLE, TO

_____

_____

_____

_____

THE UNDERSIGNED CERTIFIES THAT HE/SHE OBTAINED A REPRESENTATIVE SAMPLE OF THE WASTE MATERIAL DESCRIBED IN THE GENERATOR'S WASTE MATERIAL PROFILE SHEET ABOVE REFERENCED, AND THAT THE FOLLOWING REPRESENTATIONS ARE TRUE AND CORRECT.

1. HOUR AND DATE OF SAMPLING: _____
2. SOURCE FROM WHICH SAMPLE TAKEN: _____
   _____
   _____
3. EQUIPMENT AND SAMPLING METHOD USED: _____
   _____
   _____
   _____
4. AMOUNT OF SAMPLE OBTAINED _____
5. TYPE OF CONTAINER INTO WHICH SAMPLE WAS PLACED _____
   _____
6. THE SAMPLING EQUIPMENT USED, AND THE CONTAINER INTO WHICH THE SAMPLE WAS PLACED, WERE THEMSELVES UNCONTAMINATED BEFORE USE.
7. AT THE TIME OF SAMPLING I AFFIXED A LABEL TO THE CONTAINER IN THE FOLLOWING FORM WITH THE FOLLOWING INFORMATION (FILL IN THIS PORTION, INCLUDING YOUR SIGNATURE, JUST AS IT APPEARS ON THE LABEL YOU PREPARED):

GENERATOR
WASTE NAME:
SAMPLE HOUR/DATE:
PROFILE SHEET CODE:
SAMPLER SIGNATURE:

WITNESS VERIFICATION: I WAS PERSONALLY PRESENT DURING THE SAMPLING DESCRIBED; I DIRECTED THE WASTE SOURCE TO BE SAMPLED, AND I VERIFY THE INFORMATION ABOVE NOTED.

WITNESS: _____

SIGNATURE: _____

TITLE: _____

EMPLOYER: _____

DATE: _____

SAMPLER NAME: _____

SIGNATURE: _____

TITLE: _____

EMPLOYER: _____

DATE: _____

LABORATORY REVIEW OF SAMPLING PROTOCOL

BASED UPON MY REVIEW OF THE ABOVE PROFILE SHEET, I CONCLUDE THAT THE ABOVE METHODOLOGY IS

☐ ADEQUATE FOR YIELDING A REPRESENTATIVE SAMPLE

☐ INADEQUATE FOR THE REASONS NOTED HEREON

DATE:

Waste Management, Inc.

GENERATOR'S WASTE MATERIAL PROFILE SHEET

WASTE PROFILE SHEET CODE: D 52010

SDR

EXHIBIT 3.3.7.2

A GENERAL INFORMATION

GENERATOR NAME | TRANSPORTER

FACILITY ADDRESS | TRANSPORTER PHONE

GENERATOR USEPA I.D.

GENERATOR STATE I.D.

TECHNICAL CONTACT | TITLE | PHONE

NAME OF WASTE

PROCESS GENERATING WASTE

B PHYSICAL CHARACTERISTICS OF WASTE

COLOR

ODOR ☐ NONE ☐ MILD ☐ STRONG

DESCRIBE

PHYSICAL STATE @ 70°F: ☐ SOLID ☐ SEMI-SOLID ☐ LIQUID ☐ POWDER

LAYERS: ☐ MULTILAYERED ☐ BI-LAYERED ☐ SINGLE PHASED

FREE LIQUIDS: ☐ YES ☐ NO

VOLUME %

pH: ☐ < 2 ☐ 2-4 ☐ 4.1-6.9 ☐ 7 ☐ 7.1-10 ☐ 10.1-12.5 ☐ > 12.5 ☐ N/A ☐ EXACT

SPECIFIC GRAVITY: ☐ < 8 ☐ 8-1.0 ☐ 1.1-1.2 ☐ EXACT ☐ 1.3-1.4 ☐ 1.5-1.7 ☐ > 1.7

FLASH POINT: ☐ < 70°F ☐ 70°F-100°F ☐ 101°F-139°F ☐ 140°F-200°F ☐ > 200°F ☐ NO FLASH ☐ EXACT ☐ CLOSED CUP ☐ OPEN CUP

C CHEMICAL COMPOSITION (TOTALS MUST ADD TO 100%)

D METALS ☐ TOTAL (PPM) ☐ EPA EXTRACTION PROCEDURE (mg/L)

ARSENIC (As)		SELENIUM (Se)	
BARIUM (Ba)		SILVER (Ag)	
CADMIUM (Cd)		COPPER (Cu)	
CHROMIUM (Cr)		NICKEL (Ni)	
MERCURY (Hg)		ZINC (Zn)	
LEAD (Pb)		THALLIUM (Th)	
CHROMIUM HEX (Cr+6)			

E OTHER COMPONENTS (TOTAL PPM)

CYANIDES		PCBS	
SULFIDES		PHENOLICS	

F SHIPPING INFORMATION

DOT HAZARDOUS MATERIAL? ☐ YES ☐ NO

PROPER SHIPPING NAME

HAZARD CLASS | I.D. NO. | R.Q.

METHOD OF SHIPMENT ☐ BULK LIQUID ☐ BULK SOLID ☐ DRUM (TYPE/SIZE)

ANTICIPATED VOLUME | GALS | CUBIC YARDS | OTHER

PER: ☐ ONE TIME ☐ WEEK ☐ MONTH ☐ QUARTER ☐ YEAR ☐

G HAZARDOUS CHARACTERISTICS

REACTIVITY ☐ NONE ☐ PYROPHORIC ☐ SHOCK SENSITIVE ☐ EXPLOSIVE ☐ WATER REACTIVE ☐ OTHER

OTHER HAZARDOUS CHARACTERISTICS

☐ NONE ☐ RADIOACTIVE ☐ ETIOLOGICAL ☐ PESTICIDE MANUFACTURING WASTE ☐ OTHER

USEPA HAZARDOUS WASTE? ☐ YES ☐ NO

USEPA HAZARDOUS CODE(S)

STATE HAZARDOUS WASTE? ☐ YES ☐ NO

STATE CODE(S)

H SPECIAL HANDLING INFORMATION

☐ ADDITIONAL PAGES ATTACHED

I HEREBY CERTIFY THAT ALL INFORMATION SUBMITTED IN THIS AND ALL ATTACHED DOCUMENTS IS COMPLETE AND ACCURATE AND THAT ALL KNOWN OR SUSPECTED HAZARDS HAVE BEEN DISCLOSED.

AUTHORIZED SIGNATURE | TITLE | DATE

EA0451

EXHIBIT 3.3.7.3

WESTERN PROCESSING

CHEMICAL WASTE MANAGEMENT, INC.
ENVIRONMENTAL REMEDIAL ACTION DIVISION
WASTE PROFILE LOG

PROJECT: _____

DATE: __/__/__

PROFILE #	DESCRIPTION	DATE SUBMITTED	DATE ACCEPTED	FACILITY

3.4 ANALYTICAL PLAN

3.4.1 General

The classification and identification of wastes through analysis plays a vital role in the remedial action program at Western Processing. The results of these activities will establish the safe handling and proper disposal methods of all wastes which will be encountered.

Sections 3.4.2, 3.4.3, and 3.4.4 will describe the on-site analyses and classification procedures which will be used on the project. Section 3.4.5 describes the detailed analyses required by CWM to make a waste disposal decision. Each CWM facility has site specific analytical requirements based upon the chemical composition, physical state, packaging/containerization, and preferred disposal methodology for the waste.

3.4.2 Waste Classification/Fingerprint Analysis

Sampling and Analysis will be conducted in a manner which will provide information for proper shipment and disposal. Waste materials will be analyzed on-site to determine the D.O.T. Hazard Class and the the R.C.R.A. Hazardous Waste Characteristics. This information is necessary for properly completing manifests and for selection of a permissible shipping container. Materials will likely fall into the following D.O.T. Hazard Classes:

1. ORM-E;
2. Flammable Liquid/Solid;
3. Corrosive;
4. Poison B

Because of the lack of history surrounding the waste and the generating processes, only the characteristic categories for R.C.R.A. classification will be used. Materials from the Western Processing site will be characterized in one or more of the following ways:

1. D001 - Ignitables;
2. D002 - Corrosives;
3. D003 - Reactives;
4. D004 through D011 - EP toxic;
5. D000 - All other waste.

Exhibit 3.3.2. illustrates a Fingerprint Flowchart which has been developed to assist in delineating the above categories.

The following is a description of each test protocol for each category.

Ignitables. A waste is an ignitable hazardous waste if it has a flash point below 140 degrees F. All waste will be sampled according to our sampling plan. Each sample will be screened by taking an open flame and exposing it to the sample. This flame will be generated using a propane source. If the sample supports combustion, it will be classified as an ignitable.

Corrosives. A waste is classified as a corrosive hazardous waste if it is aqueous and has a pH less than or equal to 2.0 or greater than or equal to 12.5. All wastes will be screened using pH paper. Any samples that have a pH that is less than 4.0 or greater than 10 will be classified as a corrosive. For those wastes that are solids, a 10% water solution will be used.

Reactives. A waste is classified as a reactive if, upon addition of water, it reacts violently, forms potentially explosive mixtures, or generates toxic fumes, vapors or gases in quantities sufficient to present a danger to human health or the environment. This testing will also include the following.

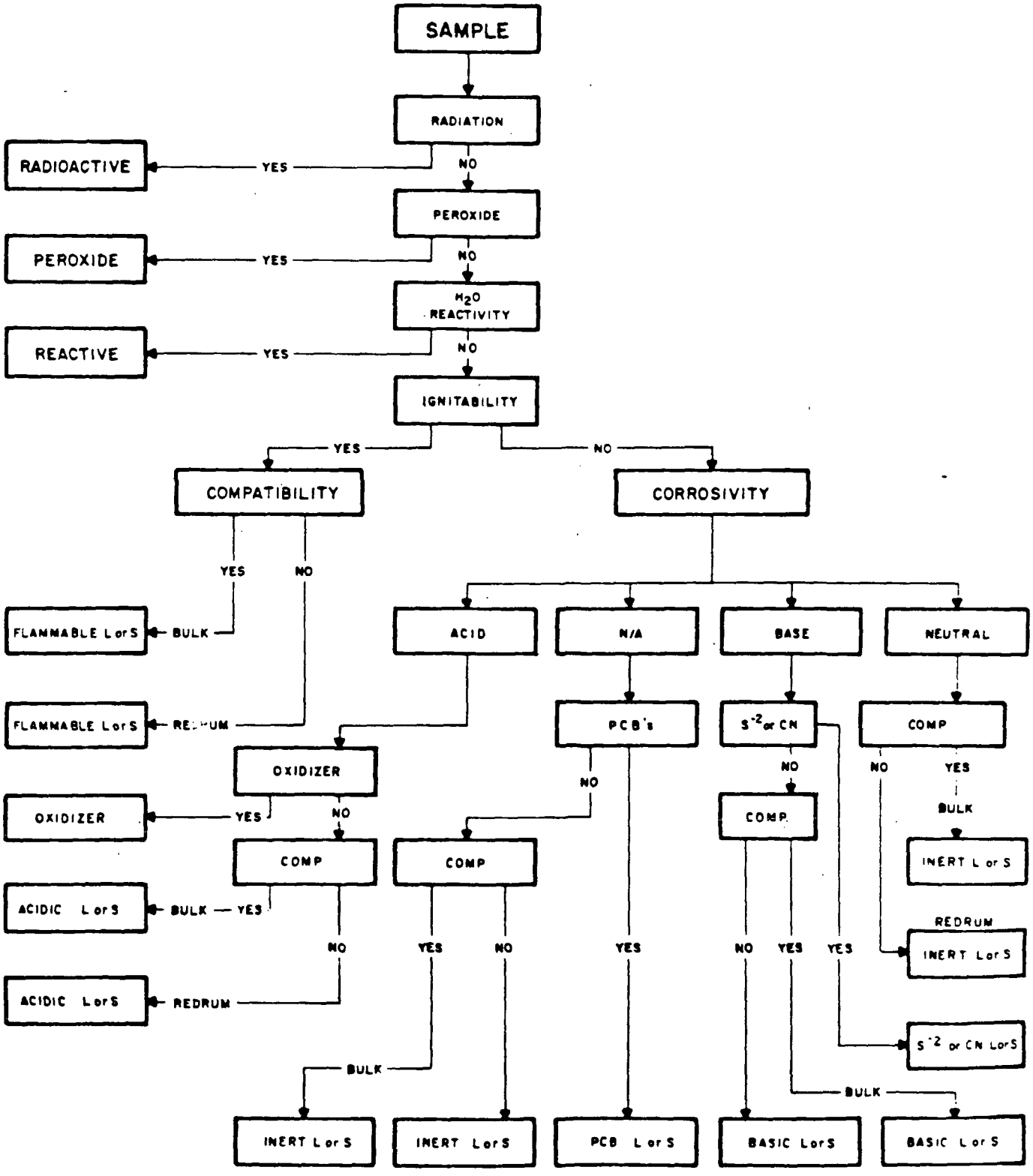
Reactive Cyanides Screen - To a beaker containing approximately 20 ml of sample, enough caustic is added to bring the pH to 12 or 13; then 5 to 10 ml of 10% ferrous sulfate solution is added and stirred; 5 to 10 ml of 5% ferric chloride solution is then added; and enough concentrated sulfuric acid is slowly added to bring the pH down to 1.0 or less. A bright blue or

EXHIBIT 3.3.2

WESTERN PROCESSING

FINGERPRINT FLOW CHART

(ILLUSTRATIVE)



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green color indicates the presence of cyanide. This test can detect free cyanide and many complexed cyanides in concentrations down to less than 100 ppm.

Reactive Sulfides Screen - To a beaker containing approximately 20 ml of sample, enough concentrated sulfuric acid is slowly added to bring the pH down to 1.0 or less. Immediately after adding the acid, a wet strip of lead acetate paper is held over the beaker while agitating the contents. If the paper turns brown or silvery black, the presence of sulfides in the sample is indicated. If there is no color change, then total sulfides are reported as non-detectable (i.e., less than 100 ppm).

Peroxide Screen - All material will be screened for peroxides using peroxide specific test strips.

Oxidizer Screen - All material will be screened with dilute acid dipped KI test strips to determine if they are oxidizers. The sodium nitrate basic will be acidified first.

Water Solubility - All material will be tested for water solubility. A portion of the sample will be placed in water for observation. Non-soluble material will be noted as floating or non-floating.

Compatibility

Before drums are bulked together, it will be necessary to determine whether the wastes are compatible when mixed. Compatibility testing utilizes similar sized aliquots of individual drum samples of the same waste category. These individual drum sample aliquots will be mixed together and then observed. Indications of incompatibility are gas evolution, heat generation, polymerization, excess precipitation, etc. If any of the above are noted, the incompatible drum(s) will be determined and shipped without bulking with other waste.

Radiation

To minimize unnecessary exposure of sampling and laboratory personnel to radiation, all drummed wastes will be screened for beta and gamma radiation prior to opening. This is done via the use of a portable hand-held dosimeter. The sensitivity of the instrument is checked daily. The instrument is calibrated biannually by a laboratory approved by the NRC. Any positive readings would be recorded and the source identified and isolated.

If no regulated levels of radiation are detected, the drums will be opened and sampled. Once the samples are taken to the lab they are opened and screened for radiation using a stationary rate meter. It is calibrated daily using two low level radioactive sources.

This test is easily performed. A probe is set up at the fingerprint station. As the sample is being logged in, it is held under the probe. An audible counter is used which readily identifies any positive counts. If a radioactive source is identified, more extensive quantitative and qualitative analysis will need to be performed.

3.4.3 Fingerprint Logging

A notebook will be used for logging results of each sample fingerprint analysis. The logging process can be simplified by recording only positive results for qualitative test. The fingerprint log will, at a minimum, include sample number, chemist initials, a column for each test in the fingerprint process and a column for the general waste classification. A sample log is included as Exhibit 3.4.3.

3.4.4 Additional On-Site Analyses

In addition to the Classification/Fingerprint analyses, CWM will perform on-site analysis for PCB. The concentration of PCB is critical in the determination of the safe handling and proper disposal. PCB will be analyzed accordingly to SW-846, Method 8080 or equivalent on all tanks, transformers, and ten drum composites of PCB suspect drums.

EXHIBIT 3.4.3
CHEMICAL WASTE MANAGEMENT, INC.
ENVIRONMENTAL REMEDIAL ACTION DIVISION
FINGERPRINT SAMPLE LOG

Date	Sample No.	State	H_2O Rx	H_2O Solubility	ph	Ignite/ Flash	CN^-	S^{-2}	Peroxide	Oxidizer	Classification	Chemist Initials	Comments

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3.4.5 Detailed Analyses

3.4.5.1 General

The above on-site fingerprint and PCB analyses are intended to characterize wastes into broad categories. Before wastes are moved off-site for disposal, a more detailed chemical and physical analysis will be performed on all tank samples and on composites of up to a maximum of 85 drum samples in each waste category. This composite sample will be forwarded to a CWM certified laboratory including, but not limited to the CWM Technical Center, Riverdale, Illinois; Chem Securities Systems, Arlington, Oregon; and CWM-Kettleman Hills, California. If necessary, CWM-ENRAC may select and certify a non-CWM laboratory located near the Western Processing site. Chain of Custody procedures will be strictly followed in all cases. A Special Waste Analysis Report will be generated following laboratory analyses (See Exhibit 3.4.4).

3.4.5.2 Special Waste Analysis Report Procedures

The following tests may be used to provide the necessary information for completion of the Special Waste Analysis Report (see Exhibit 3.4.4).

A. <u>pH</u>

This can be done by using either pH paper or a pH meter, depending upon the type of sample to be analyzed. If a pH meter is used, it must be standardized daily with at least two (2) different buffer solutions and then checked with a third buffer solution (different than the other two). If the material is solid, then report the pH of a 10% solution. pH results will be reported to one significant figure.

B. <u>Percent (%) Acidity</u>

This may be done if the pH is less than or equal to 4.0 by titration against standardized NaOH. Percent acidity results will be reported to two significant figures.

EA0459

SPECIAL WASTE ANALYSIS REPORT

LABORATORY: _____

PROFILE SHEET RECEIVED ON: _____ REPRESENTATIVE SAMPLE RECEIVED ON: _____

CERTIFICATE OF REP. SAMPLE RECEIVED: _____ SAMPLE TAKEN: _____

PROPOSED TREATMENT/DISPOSAL FACILITY: _____

THE ANALYSES BELOW REPORTED WERE SELECTED BY ME, BASED UPON THE GENERATOR'S REPRESENTATIONS IN THE PROFILE SHEET AND ANY APPLICABLE WASTE ANALYSIS PLAN ESTABLISHED BY THE PROPOSED FACILITY FOR WASTE OF THIS TYPE. ANALYSES REQUIRED BY A WASTE ANALYSIS PLAN ARE INDICATED BY AN ASTERISK (*).

DATE OF ANALYSIS: _____ LAB MANAGER: _____

Test	As Received	Leachate	Analyst Initials	Test	As Received	Leachate	Analyst Initials
Specific Gravity							
pH							
Acidity, % as							
Alkalinity, % as				Phenols, mg/l			
C O D, mg/l				Cyanides, as CN, Total, mg/l			
B O D_5, mg/l				Cyanides, as CN, Free, mg/l			
Total Solids @ 105°C							
Total Dissolved Solids, mg/l				Nitrogen, Ammonia, as N, mg/l			
Total Suspended Solids, mg/l				Nitrogen, Organic, as N, mg/l			
Residue on Evaporation @ 180°C				Total Kjeldahl Nitrogen, as N, mg/l			
Flash Point, F°				Total Alkalinity (P), as $CaCO_3$, mg/l			
Ash Content, on ignition				Total Alkalinity (M), as $CaCO_3$, mg/l			
Heating Value, BTU/lb				Total Hardness, as $CaCO_3$, mg/l			
"Acid Scrub," gNaOH/g				Calcium Hardness, as $CaCO_3$, mg/l			
				Magnesium Hardness, as $CaCO_3$, mg/l			
Arsenic, as AS, mg/l							
Barium, as Ba, mg/l							
Boron, as Bi, mg/l				Oil and Grease, mg/l			
Cadmium, as Cd, mg/l							
Chromium, Total as Cr, mg/l							
Hexavalent Chromium @ Cr, mg/l				Aldrin, mg/l			
Copper, as Cu, mg/l				Chlordane, mg/l			
Iron, Total as Fe, mg/l				DDT's, mg/l			
Iron, dissolved, as Fe, mg/l				Dieldrin, mg/l			
Lead, as Pb, mg/l				Endrin, mg/l			
Manganese, as Mn, mg/l				Heptachlor, mg/l			
Magnesium, as Mg, mg/l				Lindane, mg/l			
Mercury, as Hg, mg/l				Methoxychlor, mg/l			
Nickel, as Ni, mg/l				Toxaphene, mg/l			
Selenium, as Se, mg/l				Parathion, mg/l			
Silver, as Ag, mg/l				2, 4 D, mg/l			
Zinc, as Zn, mg/l				2, 4, 5, TP (Silvex), mg/l			
				PCB's, mg/l			
Bicarbonates, as HCO_3, mg/l							
Carbonates, as CO_3, mg/l							
Chlorides, as Cl, mg/l							
Fluorides, as F, mg/l							
Nitrate, as NO_3, mg/l							
Nitrite, as NO_2, mg/l							
Phosphate, as P, mg/l							
Sulfate, as SO_4, mg/l							
Sulfides, as S, mg/l							

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FORM WMI-52 (Rev 11-6-80)

C. Percent (%) Alkalinity

Alkalinity may be calculated on samples with pH greater than 10.0 by titration against standardized HCL. Values will be reported to two significant figures.

D. Flash Point

For liquids and semi-liquids, a Pensky-Martens Closed Cup Flash Point Tester is required. Flash point will be reported to the nearest degree Fahrenheit. For semi-solids and solids, the Cleveland Open Cup Flash Point Tester is required. This is a subjective test to determine the safety and fire hazards associated with the waste, as well as DOT shipping requirements.

E. Percent (%) Total Solids

This is done by drying the sample for approximately 24 hours at 105 degrees C. Percent total solids results will be reported to two (2) significant figures.

F. Percent Ash Content

This is done by heating the sample (after percent total solids have been done) for 12 hours at 550 degrees C. Percent ash content results will be reported to two (2) significant figures.

G. % Water

This is done by Dean-Stark distillation.

H. Oil and Grease

This is done gravimetrically after freon extraction.

I. Heavy Metals

The following sample preparation and analytical methods or other similar methods will be utilized for heavy metal analysis as necessary. Representative samples are obtained by various methods, depending upon the physical characteristics of a particular sample. Generally stated they are as follows:

1. Liquids

A. Single phase liquids with little or no solids are mixed by hand and a homogenous sample is immediately withdrawn.

B. Liquids containing sediment and/or precipitates are mixed by hand and/or in a high shear mixer (to the analyst's discretion). If the solids will not stay in suspension the liquid and sediment portions are sampled and combined proportionally.

C. Multiple phased liquids are mixed with a high shear mixer. If the sample emulsifies (homogenizes) a representative sample is taken. If the sample does emulsify the phases are sampled proportionally and combined for analysis.

2. Solids

Solids are mixed by and/or coned and quartered until a homogenous sample can be withdrawn. Solid samples may be pulverized to uniform easy-to-work with size.

3. Sludges

Sludges are mixed by and/or mixed with big shear blender until a homogenous sample can be taken.

NOTE: Heavy metal digestions are performed by four basic methods:

1. Nitric Acid Digestion

Between 1.0 gm and 10.0 gm of raw sample is accurately weighed to two (2) decimal places into a 125 ml Erlenmeyer flask, 5.0 ml of concentrated Nitric Acid (HNO_3) and several milliliters of deionized water are added. The flask is covered with a watch glass and heated to boiling. Additional water is added as needed to prevent the sample from evaporating to dryness. Heating is continued until the digestion is complete; usually this is signalled by the absence of any orange NOx fumes when adding additional nitric acid. When the flash is cool, the sample is transferred and diluted to volume (*typically 100 mls) with deionized water in a volumetric flask, and filtered through #2 whatman filter paper. The filtrate is then analyzed for heavy metals using an Atomic Absorption spectrophotometer and/or Inductively Coupled Argon Plasma unit that has been standardized with the appropriate "Acid Blank" and "Acid Standards".

$$\text{Metals as received} = \frac{\text{Final Dilution}}{\text{Original sample size}} \times \text{A.A. or I.C.A.P. reading}$$

2. Modified Nitric Acid Digestion For Acids

If a material is an aqueous strong acid (greater than or equal to 5%), between 1.0 gm and 10.0 gm of the raw sample are accurately weighed, to two decimal places, into a volumetric flask. 5.0 ml of nitric acid are added (to match the acid blank) and the sample is diluted to volume (typically 100 ml) with deionized water. Gravity filter through #2 Whatman filter paper and collect the filtrate.

$$\text{Metals as received} = \frac{\text{Final Dilution}}{\text{Original sample size}} \times \text{A.A. or I.C.A.P. reading}$$

3. Permanganate Digestion For Mercury

All samples are analyzed for mercury by cold vapor using SW-846 Method 8.57.

4. Parr Bomb Digestion

Highly organic samples may be digested in a "Parr" acid digestion bomb and then analyzed according to the method.

J. Phenols

The following or other similar methods may be utilized for phenol analysis if necessary for disposal site acceptance.

Direct Photometric Method

Procedure

Standard methods, methods 510A and 510C.

K. Polychlorinated biphenyl (PCB)

SW 846, Method 8080, or equivalent

L. Pesticides

SW-846 Method 8080 or equivalent

M. Herbicides

SW-846 Method 8150 or its equivalent. Herbicides will be determined only if suspected, or upon special request.

N. Physical Appearance

A concise description of the waste is noted by the analyst including physical state, color, turbidity, viscosity, and texture. Obvious or objectionable odors are noted, without deliberately smelling the sample.

O. Solvents

Common, industrial solvents are analyzed on non-aqueous liquids. The method utilizes a GC equipped with an FID detector. Quantitation is by external standard analysis. Solvents are identified by retention time or by GC-MS confirmation.

P. Specific Gravity

As specified in "Standard Methods" 15th Edition, 1980.

Q. Corrosion Test

Quick Corrosion test on mile steel, aluminum, copper, brass, various stainless steel and other metals can be determined by a corrosion rate meter.

R. Vapor Pressure

Vapor pressure can be measured using a constant temperature bath, vapor pressure bomb and vapor pressure bomb gauge.

S. BTU/lb Analysis

This analysis may be conducted using Bomb Calorimetry if the waste is to be evaluated for incineration. Detailed procedure for testing BTU value is supplied along with the equipment by the manufacturer.

3.4.5.3 Waste Profile Sheet Documentation

A CWM Waste Profile Sheet (Exhibit 3.3.7.2) will be completed for each tank, drum composite, and other identifiable waste stream. The Profile Sheet will be completed by the on-site ENRAC Project Manager, the on-site Chemist, or the ENRAC Chemist at the CWM Technical Center, based on the analytical data obtained from the detailed analyses described in Section 3.4.5. For many wastes, this information is readily available from the analytical data. For other wastes (eg: heavy oils, solids, sludges) generic terms such as "inorganic solids" and "oil and grease" will be used.

References:

Standard Methods for the Examination of Water and Wastewater, 15th Edition, 1980.

Test Methods for Evaluating Solid Waste (SW-846), Second Edition, July, 1982.

3.4.6 Mobile Laboratory

CWM-ENRAC will be performing the waste classification and fingerprint analysis in CWM-ENRAC on-site mobile laboratory. Exhibit 3.4.6 demonstrates the common layout of CWM-ENRAC mobile laboratories. This mobile laboratory will be equipped with the necessary instrumentation, equipment and supplies to perform any analysis described in Section 3.4.1 through 3.4.4. This equipment includes the following:

Gas chromatograph
Vortex mixer
Digital balance
Centrifuge
Hot plate - stirrer
pH meter
Propane burners
Radiation rate meter
Miscellaneous chemicals and glassware

The mobile laboratory will be equipped with fire extinguishers. First aid kits, splints, and artificial resuscitators are also present. Eye protection will be worn at all times in the fingerprint area. No beverages or food is allowed in the laboratory at any time.

3.4.7 Sample Retention

CWM-ENRAC will retain all fingerprint and composite samples for a period of at least thirty (30) days following analysis. This sample retention will provide verification capabilities of the initial analytical results. CWM-ENRAC will notify the USEPA prior to any sample disposal. All samples will be properly disposed of utilizing lab-packaging procedures (See Section 3.7).

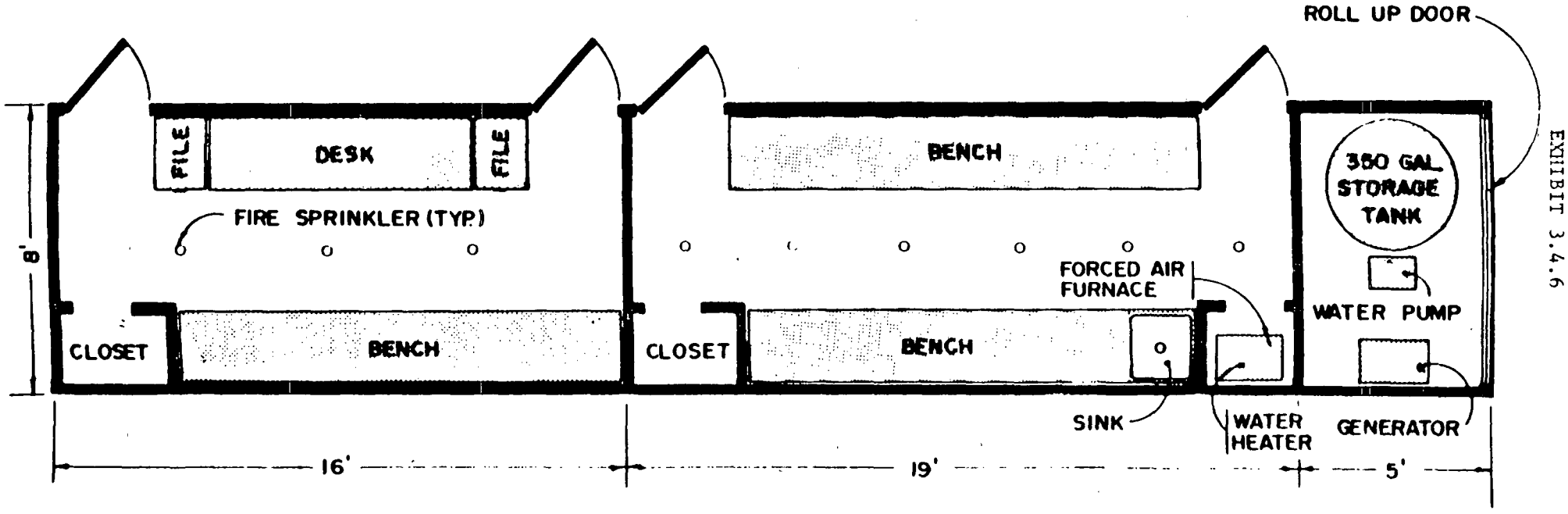

EXHIBIT 3.4.6

EA0467

MOBILE LABORATORY

(TYPICAL)

3.5 ENVIRONMENTAL MONITORING

3.5.1 Air Monitoring Program

CWM-ENRAC will initiate an environmental air monitoring program during the mobilization phase. This monitoring program is designed to establish the level of Volatile Organic Vapors (VOC's) upwind, leaving the site and in other locations that are in close proximity of the Western Processing site.

The proposed plan recommends a short-term period of intensive sampling during which specific VOC emissions are identified and quantified for three (3) different levels of activity at the site. The data from this period will be evaluated with regard to component make-up, associated threshold limit values (TLVs), published odor threshold values, variations in weather patterns, and variations in remedial site activities. A follow-up sampling program will be designed to monitor VOC concentrations continuously for the remainder of the clean-up activity period and provide a mechanism to limit activities if necessary. The proposed program is summarized in Table 3 on the following page.

This air monitoring program will be executed by CWM-ENRAC personnel trained in air monitoring equipment operation including but not limited to equipment calibration, set-up, preventative maintenance, and basic data interpretation. The CWM-ENRAC on-site Safety Representative will be qualified to interpret the data produced from the air monitoring results. He will also be competent in making health and safety decisions (i.e. upgrade protection levels, evacuation, etc.) necessary to protect both on-site personnel and nearby residents. Should perimeter sampling stations indicate elevated levels of VOC's, additional downwind stations will be established. In the event the level of VOC's is determined to be potentially harmful to nearby residents by the CWM-ENRAC on-site Safety Representative, evacuation procedures, as agreed upon by CWM-ENRAC and local authorities, would be initiated.

A copy of ENRAC's Standard Operating Methods has been included and is referenced as Appendix A.

3.5.2 Particulate Monitoring

At the initiation of site remediation activities, CWM-ENRAC will commence with its perimeter particulate monitoring program. It shall be the responsibility of CWM-ENRAC's Health and Safety Representative in conjunction with the Project Manager to review the monitoring results and determine if modifications to the daily on-site operations are required. The monitoring apparatus is anticipated to consist of, but not limited to, high volume air sampler(s) fitted with particulate collection cassettes.

WESTERN PROCESSING

TABLE NO. 3
DESCRIPTION OF VOC MONITORING DURING DIFFERENT PHASES OF THE PROJECT

Project Phase	Activity Level	Coverage of Time Period	Description of Sampling	Analysis Method	Use of Results
Sampling Program Intensive	Qualitative	2 days	Charcoal tubes	GC/MS	To identify typical VOC's on the site.
	Background	1 week during 1st two weeks of site availability.	Charcoal tubes and OVA	GC GC/MS	To identify and quantify the specific VOC's leaving the site.
	Normal	1 week during 1st two weeks of operation	Charcoal tubes and OVA	GC GC/MS	Quantify specified VOC levels at the perimeter during normal operation.
	Maximum	Two days of maximum activity	Charcoal tubes and OVA	GC GC/MS	Quantify the maximum potential levels of VOC leaving the site during maximum operating conditions.
Routine Monitoring	Normal	Start to finish of remedial work	OVA	N/A	To ensure the VOC migration is at or below allowable levels and to determine when response sampling using charcoal tubes is required.
Response Sampling	Normal to maximum	As deemed necessary by routine sampling	Charcoal tubes and OVA	GC GC/MS	Quantify specific VOC's leaving the site in response to high levels found by OVA during routine sampling.

APPENDIX A

General

This monitoring protocol is designed to establish levels of volatile organic compounds (VOC's) leaving the site and in the work areas to determine levels of personnel protection. Prior to the start of on-site activities, both quantitative and qualitative analysis will be performed to establish baseline levels of VOC's.

Qualitative Analysis

Accurate concentrations of specific organic contaminants can be measured using personnel monitoring pumps in conjunction with charcoal tubes. The tubes used meet the specification of the National Institute of Occupational Safety and Health (NIOSH) standard method for measuring organic compounds in air, P&CAM 127. This method facilitates the sample collection and subsequent laboratory identification and quantification of contaminants. Emissions are averaged over the sampling period.

Quantitative Analysis

Meaningful continuous real time monitoring can be implemented using multiple organic vapor analyzers (OVA's) or their equivalent. These instruments are not capable of separating and quantifying single components. The flame ionization detector (FID) responds to each chemical with a different sensitivity. The sensitivity is somewhat, but not exactly proportional to, the number of carbon atoms per molecule. The OVA is calibrated with methane (CH_4). Concentrations indicted by this instrument provide a representation of VOC levels as methane. During the baseline phase of the air quality monitoring program, charcoal tube and OVA measurements will be made simultaneously at the five monitoring sites. In addition, portable OVA's or their equivalent may be utilized for monitoring the various operations. Comparison of the results during data evaluation will serve as a calibration to relate OVA measurements to the levels of specific chemicals.

Sampling Methodology

The OVA and charcoal tube collection system will be strategically located at the predetermined sites. The ambient air will be sampled at average eye level (5-6 feet) to simulate human exposure. Occasional sampling at levels lower than 5 feet may be collected should the CWM-ENRAC on-site safety representative determine it prudent.

Charcoal Tubes: The Standard Operating Procedure for the collection system using charcoal tubes is found in SOP AM-002. This details the calibration, set up, sampling and storage conditions to be met. The air is drawn through the charcoal tube and tygon connecting tubing by a battery operated personal pump. This pump undergoes a post-testing calibration daily. By measuring the lapsed sampling time, the volume of air analyzed can be determined accurately. Laboratory analysis of the tubes will yield a total collected mass of each of the volatile components. Concentrations in the air are calculated from the laboratory results and total sample volumes.

OVA: The Century Organic Vapor Analyzer (OVA) or equivalent utilizes a battery operated pump to continuously draw air and direct it into an FID. The detector sends an electronic signal to a dial readout and a small recorder which show results in ppm. The entire system is calibrated daily with known concentration of methane. All stationary OVA's will be equipped with the small recorder device, which will supply continuous readings. The recorder charts will furnish the necessary documentation to verify OVA readings at any time during the sampling period.

Analytical Procedures

Laboratory analytical procedures are described in detail in SOP AM-003 and AM-004. Gas chromatography (GC) is basically a method to separate and quantify a mixture of components. These components are recognized by the retention time associated with a known standard of the specified compound.

It is necessary to identify chemicals of concern prior to quantification. For this reason, separation with gas chromatography followed by analysis by mass spectrometer (GC/MS) has been chosen to identify and quantify compounds during the baseline phase. The mass spectrometer bombards the molecules with a stream of electrons causing fragmentation unique to each chemical. The resulting spectra is matched by computer with library reference spectra for identification.

Collected samples will be transported on ice from the Western Processing site to an approved laboratory. The samples will be received and kept cool until analysis.

During the baseline monitoring all samples will be analyzed via GC/MS. After identification of the compounds present in the air at the site, routine analysis will be scheduled for every charcoal tube sample via GC. Identified compounds will be quantified. Additionally, 20% of all samples will be analyzed by GC/MS. Replicate GC analysis will be scheduled for 10%. All GC samples with unindentifiable peaks (compounds) will be sent for GC/MS identification and quantification.

Desorption efficiencies for each compound on charcoal will be determined per NIOSH method P&CAM 127 as described in SOP AM-004.

Quality assurance begins with the use of standard, proven methods. The VOC measurement is based on NIOSH method P&CAM 127 and GC/MS analyses are based on EPA Methods 724. Reliability, sensitivity and precision of each have already been tested and found acceptable.

A standard operating procedure has been developed for each step of the sampling program. These documents are adhered to by all field personnel. Non-standard operation will be marked with flags. Standard data sheets have also been prepared for use in the field. All transactions and operations will be recorded in the VOC Air Monitoring Site log book.

This procedure has proven to be extremely important during data analysis and interpretation. Any anomalies in data interpretation may be resolved by assessing the effects of the non-standard procedures.

Equipment Calibration

Instrument error can be minimized by routine calibration and analysis of internal and external standard. Proper calibration procedures are defined for each instrument in the appropriate SOP following Section 3.5. It is important to calibrate battery powered sampling equipment after each daily sampling period. Laboratory analysis will be verified by:

1) Replicate analysis (1 out of 10 or at least 1 if there are less than 10 samples).
2) External standards of known concentration will be analyzed throughout the program.
3) Charcoal tubes will be "spiked" with each analyte to determine collection efficiency.
4) Each section of the charcoal tube samples will be analyzed separately to ensure breakthrough has not occurred.
5) charcoal tube desorption efficiencies will be determined for each compound.

Data Validation

All the data will be validated by screening procedures and all anomalies will be investigated.

Record Keeping

Sample collection and transfer will be recorded on the Sample Log Sheet (SOP AM-001). This procedure will serve to double check proper handling and care of the samples.

All records relating to the VOC monitoring program will be maintained, preserved and made available for inspection and audit. The audit may be made by state, federal, or other select agencies.

Data Reduction And Interpretation

The data collected during the sampling program will be reduced and evaluated to determine:

- Relationship between OVA and GC results;
- Types and amounts of specific organic compounds leaving the site under different operating and meteorological conditions;
- Relationship between published TLV and odor thresholds for the VOC's found at the site;
- Prevailing meteorological conditions during sampling;
- Significant relationships between observed VOC concentration and remedial activities.

Data Reduction

Data reduction and data base entry procedures will depend on the type of data. Strip charts from the OVA will be manually digitized. The gas chromatograph-mass spectrometer (GC/MS) data will be processed by the GC/MS computer system. GC data will be processed by an automatic integrator. The results will be incorporated into the data base. The meteorological data will be reduced manually and used to evaluate the prevailing meteorological conditions during testing and will also be used to classify upwind and downwind sites.

Data Validation

Different operations are performed in each step of the measurement process to control the quality of data. The final data validation step will synthesize all of the results of the quality control operations and examine the results of consistency to ensure that all data included in the data base are accurate and precise within required tolerances.

Data Interpretation

The data collected and produced during the course of the project will be interpreted to achieve the objectives. The charcoal tube and OVA results will be evaluated with respect to meteorological conditions, process

operations, and health and odor standards. Knowing the types and amounts of specific VOC's leaving the site under different meteorological and process conditions will establish the neighborhood impact. Exploratory data analysis will be performed using standard graphical and statistical techniques to gain insight into VOC emissions and their relationship to process conditions.

Reporting

A report documenting the findings of the sampling program will be prepared.

Information Flow

The data collected will be promptly reviewed and compared with allowable levels. As long as the OVA readings remain below the specified limit, the documentation will be transmitted to the regulatory agencies in a routine manner.

Worker Safety Monitoring

The greatest risk of high concentrations of VOC's will be at the excavation site. A stationary OVA will be placed near the excavation area daily. H_2S, HCN, O_2 deficiency and LEL will also be measured in a mobile fashion periodically as the situations dictate.

All drums will be screened for radiation using hand held Gieger counters prior to opening. This procedure minimizes any unnecessary worker exposure to radiation. These results will be used to determine levels of worker's protection. To document and identify exposure to individuals all on-site personnel will wear film badges capable of detecting radiation.

Each day, the ENRAC Site Safety Representative will select on-site personnel to wear personal sampling pumps/charcoal tubes to measure exposure to VOC's. The data generated will be reviewed and compared to Threshold Limit Values (TLV's) and OSHA's Permissible Exposure Levels (PEL). The results of this monitoring will become part of the employees permanent employment record.

SOP AM-001

AIR MONITORING SITE LOG BOOK

1. GENERAL DISCUSSION

The purpose of the Site Log Book is to maintain a single record which documents the field activities for the air monitoring study. The book shall be bound with numbered pages.

2. RESPONSIBILITIES

It will be the responsibility of the Site Manager to insure the Log Book is properly completed.

3. PROCEDURE

Daily entries will be made each morning to record:

1. Date
2. Time
3. Weather conditions - short description of visual observation
4. Wind speed and direction, ambient temperature
5. A list of operations
6. Any general observations
7. The name of the observer

The same observations will be made and entered in the evening before shut down.

Upon completion of a sample set, the pertinent data will be entered on the Sample Log Sheet (attached) and affixed in the Sample Log Book. This will be a record detailing which site locations were sampled, with what instrumentation and where the samples were deposited. When a batch of samples are transferred to shuttle to the laboratory, the receiving driver shall sign and date the sheet.

Calibration data sheets, field sampling sheets and strip charts will be collected after each sample set and placed in a envelope attached to the Site Log Book. These documents will be transferred to the CWM Technical Center the end of each week during the intensive sampling program. Copies of all material will be kept at the site.

WESTERN PROCESSING

Sample Log Sheet

Sample Number	Test Date/Time	Test Location	Sample Description & Comments	Date/Time of Transfer

EA0479

SOP AM-002

COLLECTION OF ORGANIC SOLVENTS IN AIR

1. GENERAL DISCUSSION

This procedure describes the collection of volatile organic compounds in ambient air. These contaminants are adsorbed onto charcoal tubes as detailed in this SOP. Samples will be analyzed via GC and/or GC/MS as directed in Section 2.3 and described in SOP AM-003 and/or SOP AM004.

This procedure is based on National Institute for Occupational Safety and Health (NIOSH) Standard Method P&CAM 127. A copy of this method is in Appendix B.

2. APPARATUS AND INSTRUMENTATION

2.1 An approved and calibrated personal sampling pump: The pump shall be battery operated and be able to maintain a 0.5-1 liter per minute flow for a minimum of 8 hours.

2.2 Charcoal tubes: Glass tube with both ends flame sealed, containing 2 sections of 20/40 mesh activated charcoal separated by a 2-mm portion of urethane foam. The activated charcoal is prepared from coconut shells and is fired at 600°C prior to packing. The absorbing section contains 400 mg of charcoal, the backup section 200 mg. A 3-mm portion of urethane foam is placed between the outlet end of the tube and the backup section. A plug of silicated glass wool is placed in front of the absorbing section. The pressure drop across the tube must be less than one inch of mercury at a flow rate of 1 pm. These tubes are prepared commercially and can be obtained as described from a reputable vendor. Caps for sealing the broken ends of the tubes after sampling should be supplied with the tubes.

2.3 Tygon Tubing: Of adequate diameter and length to connect the charcoal tube to the pump.

3. PROCEDURE

3.1 Preparation of Personal Pumps: Each personal pump is recharged for 12-16 hours prior to sampling.

3.2 Calibration of Personal Pump: Each pump should be calibrated immediately after the completion of the daily sampling. A representative charcoal tube and the tygon connector must be in place during the calibration. This system accounts for any pressure drops or variations which may be caused by the sampling media.

Procedures follow manufacturers' directions, preferably utilizing a bubble flow meter as the standard. The data are recorded on a calibration data sheet examples of which are attached to this SOP.

3.3 Collection of Samples:

3.3.1 The pump is set in place at the sampling location as described in Section 2.1 and 2.2.

3.3.2 Apply a sample identification number to the tube.

3.3.3 Record the pump ID #, Monitoring location ID #, Sample ID #, date, ambient condition, etc., on the data sheet (attached).

3.3.4 Immediately before sampling, the ends of the tube should be broken to provide an opening at least one-half the internal diameter of the tube. The tube is then to be connected to the Tygon tubing. The small section of Charcoal is used as a back-up and should be positioned nearest the sampling pump. (Commercially available tubes are marked with arrows to indicate the direction of air flow). The charcoal tube is held vertical during sampling to reduce channeling. Air being sampled is not passed through any hose or tubing before entering the charcoal tube. No sampling will take place during period of precipitation or high humidity as water reduces the adsorption efficiency of charcoal.

3.3.5 The pump is turned on and the time is noted on the data sheet.

3.3.6 The sample is allowed to run for a minimum of 3 hours.

3.3.7 At the end of the sampling period the pump is shut down and the charcoal tubes are capped immediately with the supplied plastic caps.

3.3.8 A daily blank is prepared by breaking and sealing the ends of a tube in the field. This sample is given an ID # and stored, shipped and analyzed along with the other samples. The ID number is recorded in the comments section of another data sheet.

3.4 A Sample Log Sheet is prepared at the end of each day. The sample ID #, the date collected, the run #, etc. are entered for each sample. A copy of a Sample Log Sheet is attached.

3.5 Calculations

Sample volumes are calculated from calibrated flow rates and lapsed sampling time. The pre- and post-sampling calibrations are averaged to determine the pump flow in liters per minute.

Final volume (l) = flow (l ppm) x lapsed time (min)

WESTERN PROCESSING

PERSONAL PUMP

DATA COLLECTION SHEET

Plant: _____ Project Number: _____

Date: _____ Ambient Temp.: _____

Operator: _____

Sampling Location (Bldg. No., Process Title, Stack Identity): _____

_____

_____

Pump Number: _____ Run Number: _____

Sample Number: _____ Sample Type: _____

Test Time: Start _____ Count Rate: Start _____

End _____ End _____

Total Time _____ Total Counts _____

Calibrated Flow Rate: _____ Calibrated Count Rate: _____

Process Information:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Remarks: _____

_____

WESTERN PROCESSING

CALIBRATION SHEET

Company: _____ Date: _____

Address: _____ Project: _____

Barometric Pressure: _____ Ambient Temperature: _____

Pump Number: _____ Manufacturer: _____

Sample Cassette Type: _____ Sample Cassette Size: _____

Leak Check: _____ Flow Rate Setting: _____

	Run 1	Run 2	Run 3
Calibrated Flow Rate Setting: _____	/	/	/
Average Rate (ml/min): _____	/	/	/

Remarks: _____

Post Cal Check: _____

Pump Number: _____ Manufacturer: _____

Sample Cassette Type: _____ Sample Cassette Size: _____

Leak Check: _____ Flow Rate Setting: _____

	Run 1	Run 2	Run 3
Recalibrated Flow Rate Setting: _____	/	/	/
Average Rate (Ml/min): _____	/	/	/

Remarks: _____

EA0484

SOP AM-003

GAS CHROMATROGRAPHY/MASS SPECTROSCOPY ANALYSIS

OF VOLATILE ORGANICS ON CHARCOAL

1. GENERAL DISCUSSION

An air sample is collected on pre-cleaned charcoal adsorbent. The charcoal is extracted with carbon disulfide and aliquots of the resultant extract analyzed by gas chromatograpy/mass spectroscopy (GC/MS). Compounds are identified and quantitated using guide lines given in EPA Method 624.

2. APPARATUS AND INSTRUMENTATION

2.1 Instrument: Hewlett Packard 5985 or equivalent.

2.2 Column: 8A x 2 mm (ID) glass, packed with 1% SP1000/Carbopack B 0/80 mesh.

2.3 Sample Sizes: 3 ul.

2.4 Flow: Helium, 40 ml/min.

2.5 Conditions:

Zone Temperature	175°C
Initial Temperature	60°
Final Temperature	210°
Initial Time	4 minutes
Ramp Rate	8°C/minute
Final Time	1 minute
Separator Oven Temp.	205°C
Manifold Temp.	200°C

3. STANDARDS

3.1 Preparation: Premixed standards are used for preparing analytical working standards. Aliquots are diluted in CS_2 to appropriate concentration ranges applicable to the samples of interest.

3.2 Calibration: Aliquots of working standards are used to establish instrument calibration. At least one set of standards must be analyzed each day and compared to the quantitation library. If daily standards match to ± 10%, samples may be analyzed and quantitation using the library.

4. PROCEDURE

4.1 Receipt of Samples: The samples are received at the laboratory and logged in. The charcoal tubes are kept frozen until they are desorbed with carbon disulfide.

4.2 Preparation of Samples: The urethane foam plug at the back end of the charcoal tube is removed and the latter portion is poured into an empty septum vial. The middle plug is then removed and the front charcoal section is poured into a second septum vial. Each vial then receives 2.0 ml of CS_2 and is immediately capped. The sample is labeled and stored frozen until ready for analysis.
All work with carbon disulfied is performed in a hood because of its high volatility and toxicity.

5. QUANTITATION

Internal standards are used to eliminate instrument variations. Surrogates are compounds added to original samples to determine recovery efficiency of the method every time a sample is analyzed. Response factors of each analyte relative to the internal standard are calculated as follows:

$$R.F. = \frac{(As)\ (Cis)}{(Ais)\ Cs}$$

where:

As = area of standard peak
Cis = concentration of internal standard
Ais = Area of internal standard peak
Cs = Concentration of standard

Once samples have been analyzed they are quantitated using an automatic quantitation routine. Sample concentrations are calculated by the following formula:

$$Cp = \frac{(AP \quad (Cis)}{(Ais \ (R.F.)}$$

where:

Cp = concentration of pollutant

Ap = area of pollutant peak

6. QUALITY CONTROL

Blanks and calibration standards shall be run twice daily. Duplicates shall be run for 10% of the samples to determine precision.

7. QUALITY ASSURANCE

The technical director or his designee will examine all standard, blank and replicate analyses to assure they are within stated tolerances.

8. REFERENCES

1) Federal Register, Monday, December 3, 1979, Environmental Protection Agency, pp 69526-69531.

2) "NIOSH Manual of Analytical Methods", USHEW, Volume 1, April, 1977.

SOP AM-004

ANALYSIS OF ORGANIC SOLVENTS

IN AIR VIA GAS CHROMATOGRAPHY

1. GENERAL DISCUSSION

This procedure describes the analysis of organic compounds collected on charcoal tubes via gas chromatography (GC). The method involves adsorption of the contaminants in a known volume of carbon disulfide, CS_2, and separation, identification and quantification through the use of a gas chromatograph.

2. APPARATUS AND INSTRUMENTATION

2.1 Gas chromatograph equipped with a flame ionization detector (FID).

2.2 Column (20 ft x 1/8 in) with 10% SP1000. Other columns capable of performing the required separation may be used.

2.3 A mechanical or electronic integrator or a recorder and some method for determining peak area.

2.4 Septum vials, 5 ml with teflon lined septa and crimped caps.

2.5 Syringes: Graduated 10 ul, and convenient sizes for making standards.

2.6 Pipets: 2.0 ml delivery pipets or 5.0 ml type graduated in 0.1 ml increments.

2.7 Reagents

Spectroquality carbon disulfide, CS_2

Sample of the specific compound under study, preferably chromatoquality grade.

Nitrogen, UPC

Hydrogen, zero.

Compressed air, zero.

3. PROCEDURE

3.1 Receipt of Samples: The samples are received at the laboratory and logged in. the charcoal tubes are kept frozen until they are desorbed with carbon disulfide.

3.2 Preparation of Samples: The urethane foam plug at the back end of the charcoal tube is removed and the latter portion is poured into an empty septum vial. The middle plug is then removed and the front charcoal section is poured into a second septum vial. Each vial then receives 2.0 ml of Cs_2 and is immediately capped. The sample is labeled and stored frozen until ready for analysis.

All work with carbon disulfide is performed in a hood because of its high volatility and toxicity.

3.3. The GC should be set up and tested prior to injection of standards.

3.4 Measurement of area. The area of sample peak is measured by an electronic inegrator or some other suitable form of area measurement, and preliminary results are read from a standard curve prepared as discussed below.

3.5 Duplicate injections of at least 10% of the samples and standard will be made. No more than 3% difference in area is to be expected.

3.6 Determination of Desorption Efficiency

3.6.1 Importance of Determination: The desorption efficiency of a particular compound can vary from one laboratory to another and also from one batch of charcoal to another. Thus, it is necessary to determine at least once the percentage of the specific compound that is removed in the desorption process for a given compound, provided the same batch of charcoal is used.

3.6.2 Procedure for Determining Desorption Efficiency: The ends of a charcoal tube are broken and a known amount of the compound is injected directly into the activated charcoal with a microliter syringe, and the tube is capped. the amount injected is usually equivalent to that present in a 10-liter sample at a concentration equal to the federal standard.

The tubes are prepared in this manner and allowed to stand for at least overnight to assure absorption of the specific compound onto the charcoal. These tubes are referred to as the D samples. A parallel blank tube should be treated in the same manner except that no sample is added to it. The sample and blank tubes are desorbed and analyzed in exactly the same manner as the sampling tube described in Section 3.2.

Two or three standards are prepared by injecting the same volume of compound into 2.0 ml of CS_2 with the same syringe used in the preparation of the D sample. These are analyzed with the D samples.

The desorption efficiency equals the difference between the average peak area of the samples and the peak area of the blank divided by the average peak area of the standards, or

$$\text{Desorption Efficiency} = \frac{\text{Area D sample - Area blank}}{\text{Area standard}}$$

3.6.3 Calibration and Standards: A known amount (mg) of the compound of interest is injected into a known volume of CS_2 and the vial is labeled. The density of the specific compound is used to convert into microliters for easy measurement with a microliter syringe. A series of standards, varying in concentration over the range of interest, is prepared and analyzed under the same GC conditions during the same time period as the unknown samples. Curves are established by plotting concentration in mg/2.0 ml versus peak area.

3.7 Calculations: The weight, in mg, corresponding to each peak area is read from the standard curve for the particular compound. No volume corrections are needed, because the standard curve is based on mg/2.0 ml CS_2 and the volume of sample injected is identical to the volume of the standards injected.

Corrections for the blank must be made for each sample.

Correct $mg - mg_s - mg_b$

where:

mg_s = mg found in front section of the sample tube

mg_b = mg found in front section of blank tube

A similar procedure is followed for the backup section.

The corrected amounts present in the front and backup sections of the sample tube are added to determine the total measured amount in the sample.

This total weight is divided by the determined desorption efficiency to obtain the corrected mg per sample.

The concentration of the analyte in the air sampled can be expressed in mg per m^3.

$$mg/m^3 = \frac{\text{Corrected mg x 1000 (liters/m}^3\text{)}}{\text{Air volume sampled (liters)}}$$

SOP AM-005

METEOROLOGICAL SYSTEM OPERATION

1. GENERAL DISCUSSION

This document describes the routine operational procedures applicable to wind speed and wind direction monitoring at the Western site during the remedial activity. Routine checks are designed to detect equipment malfunctions or misalignments and verify the accuracy of strip chart recorder data.

2. RESPONSIBILITIES

2.1 The field technician will be responsible for performance of routine checks in accordance with this procedure and for completion and submission of the required supporting documentation.

2.2 The supervisor is responsible for monitoring the work performed and documentation generated for conformance with this procedure.

3. CALIBRATION

The wind speed and wind direction instrumentation will be calibrated at start-up and at shut-down. Weekly performance checks will be routinely done by the field technician.

3.1 Wind Direction

3.1.1 The wind speed system will be calibrated by the use of 2 landmarks, 90° apart. This will be done with the aid of a good siting compass. Once the landmarks are determined, the sensor and vane will be aligned so as the landmarks vane and strip char agree within ±5° of designated values. All data points, i.e., landmarks, dates, operators, strip chart readings and all applicable information must be recorded in the site log.

3.2 Wind Speed

3.2.1 The wind speed system will be calibrated by the use of 2 synchronous motors with the cups removed. The values will be recorded on the strip chart as will data, time and operator, and also recorded in the site log.

3.3 Documentation

The calibrations will be documented in ink. Documentation will include the following information:

- Date and time of calibration;
- Description of location;
- All initial readings (strip chart recorders);
- All final readings;
- Identification of person(s) performing the calibration.

The calibration documentation will be recorded on the attached data sheet.

4. WIND DIRECTION AND WIND SPEED CHECKS

The field technician will perform the following weekly performance checks:

- Status - verify that the sensors are intact, and the cups and vane appear to move freely;

- Wind direction data - verify that strip chart readout, present actual vane position and observed current wind direction agree;

- Wind speed data - verify that current strip chart value appears to be reasonable based on observation; and the cups are turned appropriately;

- Manually activate a translator zero and span for both wind speed and direction.

CLIMATRONICS WIND DIRECTION CALIBRATION

SITE: _____ DATE: _____ BY: _____

LANDMARK #1 _____ ANGLE _____ LANDMARK #2 _____ ANGLE _____

INITIAL READINGS

LEVEL	LOWER ____FT.		UPPER ____FT.	
	REC.	TRANS.	REC.	TRANS.
TO LANDMARK 1	____°	____V = ____°	____°	____V = ____°
FROM LANDMARK 1	____°	____V = ____°	____°	____V = ____°
TO LANDMARK 2	____°	____V = ____°	____°	____V = ____°
FROM LANDMARK 2	____°	____V = ____°	____°	____V = ____°

PCB CHECKS

	ZERO		SPAN		540°	
	INIT.	FINAL	INIT.	FINAL	INIT.	FINAL
LOWER	____V	____V	____V	____V	____V	____V
UPPER	____V	____V	____V	____V	____V	____V
SPEC	0 ± .04 V		6.66 ± .04 V		6.66 ± .04 V	

MAXIMUM STARTING TORQUE
LOWER _____ gm-cm UPPER _____ gm-cm

POT SWITCHING OK
LOWER _____ UPPER _____

FINAL READINGS

LEVEL	LOWER ____FT.		UPPER ____FT.	
	REC.	TRANS.	REC.	TRANS.
TO LANDMARK 1	____°	____V = ____°	____°	____V = ____°
FROM LANDMARK 1	____°	____V = ____°	____°	____V = ____°
TO LANDMARK 2	____°	____V = ____°	____°	____V = ____°
FROM LANDMARK 2	____°	____V = ____°	____°	____V = ____°

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RECORDER CALIBRATION

	LOWER			UPPER		
	INIT.	FINAL		INIT.	FINAL	
ZERO						
MID SCALE						
FULL SCALE						
OLD SCALE S/N						
NEW SENSOR S/N						
OLD CC S/N						
NEW CC S/N						

TEST EQUIPMENT

DVM MFG. _____ MODEL _____ S/N _____ RECAL DUE _____

TORQUE GAUGE MFG. _____ MODEL _____ S/N _____ RECAL DUE _____

WIND SPEED

r··vork: _____ Site _____ Level: _____

Sc..sor Manufacturer: _____ Model #: _____

Technicians: _____ Date: _____

S/N _____

INITIAL SYSTEM CHECKS

Motor Speed (RPM)	Counter Indication (Hz)	Waveform		Translator		Recorder (MPH)	DAS (MPH)
		OK?	Amplitude	Volts	MPH		

Torque Test:

CIRCUIT CARD CALIBRATION

	Initial			Final		
	Voltage	Recorder	DAS	Voltage	Recorder	DAS
Zero (0 Hz)						
MID (Hz)						
F S (Hz)						

S/N _____

FINAL SYSTEM CHECKS

Motor Speed (RPM)	Counter Indication (Hz)	Waveform		Translator		Recorder (MPH)	DAS (MPH)
		OK?	Amplitude	Volts	MPH		

Torque Test

TEST EQUIPMENT

Instrument	Manufacturer	Model	Serial Number	Recal Due Date

Tolerance on final system error = ±1% of full scale

Signature: _____ QC Review _____

3.6 DRUM HANDLING

3.6.1 Drum Staging

According to a U.S.E.P.A. estimate, there are approximately 1,400 drums of liquids, 900 drums of solids and 4,000 empty drums located on the Western Processing site. Each drum will be inspected for leakage prior to any handling. Any drums found leaking will be overpacked to prevent further ground water contamination. All drums containing liquids or solids will be processed on level ground and in a relatively dry area. Some ground preparation may be necessary. Staging areas should be upwind of expected seasonal wind direction as it relates to other on-site operational activities.

The layout of the staging area will depend upon the size and terrain of the work site. The drums will be staged to allow easy access for sampling and working. A common method is lining up 15-25 drums in a double row single stacked. Aisles will be left open to allow access for the equipment and personnel involved in bulking operations and for emergency response.

Drum handling will be undertaken using vehicles modified with a drum gripping apparatus capable of working in very tight quarters. For efficiency in open areas, a double drum handling system can be used.

The procedure will begin by unstacking the outer-most rows of drums if necessary and moving them to the pre-determined staging area. After the top rows are removed, the bottom rows will be moved and placed in the staging area.

Empty overpacks will be placed near drums being moved in order to reduce transport distance of leaking or unstable drums. Drums will be picked up as close to the top of the drum as possible. Drums requiring overpacks will be lowered into the overpack as far as the grabber will allow, and then released. Open drums and overpacks will be covered to reduce rainwater infiltration and release of volatiles. Staged drums will be

visually inspected daily for structural integrity. Any leaking drums will also be overpacked to prevent further potential contamination of the ground water. Should any minor spillage occur during drum handling, CWM-ENRAC personnel will treat the spill with an available absorbant. The absorbant material will be properly containerized during the daily inspection of the staged drums. Major spills will be handled as described in Section 3.14 Spill Response and Control.

Any drum containing material identified as being extremely hazardous by itself (or in combination with other drums in the vicinity) due to reactivity or shock sensitivity will be identified and the crew foreman notified of its presence. These drums will be segregated from the already staged drums and treated as described in Section 3.9.4.

Drums fuming or boiling prior to sampling will be inspected by the chemist and appropriate isolation determined. Upon isolation the chemist and on-site Safety Representative will determine the necessary handling requirements.

3.6.2 Drums Containing Liquids

CWM-ENRAC will withdraw samples of drums found containing liquids in accordance with the sampling plan (Section 3.3). Each drum will be marked according to its waste category, (see 3.6.4) as determined from the analytical results.

The bulking of liquid wastes will be accomplished by removal of the pumpable wastes via vacuum extraction from the drums. The main bulking task will be conducted by an on-site crew accompanied by a vacuum truck. Prior to bulking of the drums into the vacuum tanker, each drum will be tested for compatibility with the other drums in that particular waste category. Once the vacuum vehicle is positioned in the staging area, the crew will insert the suction nozzle from the truck down into the drum for removal of its contents. The crew repeats this process until the holding capacity of the truck is attained.

Once at its capacity, the vacuum truck will move to the bulk material staging area which consists of either existing on-site tanks or mobile storage vessels designated to receive the classified wastes. When a sufficient quantity of material is transferred to the on-site storage vessels, a detailed analysis will be performed on a representative sample of the batch. Following analysis of the batch, the contents will be extracted by over-the-road transport vehicles outfitted with vacuum suction capabilities.

Stationary pumping is a viable alternative to the vacuum truck if the staging area is relatively close to the bulk storage vessels. The criteria include whether the staging hose can safely reach the staging area and operate in an efficient manner.

The bulking task is conducted by an on-site crew accompanied by a stationary pump hose connected to an on-site storage vessel. Individual drum compatability testing of the waste to be bulked into the same tank will be performed. The crew then inserts the suction nozzle into the drum for removal of contents. The crew repeats this process on compatible drums until the holding capacity of the on-site storage vessel is sufficiently full.

When a sufficient volume of classified wastes have been accumulated in the on-site vessels, a detailed analysis will be performed on a sample. The contents will be extracted by over-the-road transport vehicles outfitted with vacuum suction capabilities.

3.6.3 Drums Containing Solids

Drums found containing strictly solids will also be sampled in accordance with the sampling plan (Section 3.3). Upon receiving the analytical results, each drum will be appropriately marked to designate its waste category. In addition, each drum will be inspected for transportability. Any drums found not meeting Department of Transportation (DOT) specifications for transport will be placed into 85 gallon overpacks. This overpacking will assure proper DOT transport and eliminate potential container leakage during the transportation phase.

3.6.4 Drum Coding

The chemist performing fingerprint analyses (see 3.4.2) will indicate the material classification for each drum of waste. Identifying waste classes by drum assures that only compatible wastes will be bulked together.

The chemist will mark drums using colored spray paints (or similar method) on the top and side. Material classes will be indicated in the following manner:

Green:
- △ - ORM-E Liquid (inert)
- P - ORM-E Solid (inert) or route to crushing area
- O - PCB Suspect

Red:
- F - Flammable Liquid
- △ - Acidic Liquid
- S - Acid Solid

Yellow:
- △ - Flammable Solid
- Mt or E - Empty Drum

Blue:
- S - Base Solid
- △ - Base Liquid
- △S - Sulfide
- C or CN - Cyanide
- W or Rx - Water Reactive
- Lp - Lab Pack
- * - Resample

In special cases a combination of symbols could be used, (i.e. flammable acidic liquids - red F).

3.6.5 Empty Drums

Empty drums found on-site, including those emptied by CWM-ENRAC during processing, will undergo volume reduction prior to transportation and disposal. This volume reduction results in lower overall transportation and disposal cost.

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Drums designated for crushing will be removed from the bulking area to a staging area adjacent to the crushing operation. Depending on the size of the crushing area and drum backlog, drums may be moved directly to the crushing area for size reduction.

One or more crushing techniques will be employed to crush the drums. One technique is to place the drums on the crushing pad, compress and crush with available earth moving equipment. Another technique is to crush drums with a hydraulically activated drum compactor, which is the method of choice at the Western Processing site.

If compacting takes place on a crushing pad, the remains of the drums may either be moved to a transport vehicle waiting for disposal off-site or staged in a pile prior to loading and transportation.

The drum crushing pad will be constructed with a synthetic liner, graded to a single collection point, and bermed. In the event that unsuspected free liquids were trapped in a drum, all liquids spilled during drum crushing would be absorbed and/or collected within the confines of the crushing pad and appropriately handled without resulting in potential further soil and ground water contamination.

3.7 LABPACK HANDLING, TRANSPORTATION, AND DISPOSAL

It is understood that quantities of miscellaneous laboratory chemicals will be encountered in some of the buildings on the Western Processing site. Due to the potentially reactive and extremely hazardous nature of many of these materials, special procedures for handling these materials will be utilized throughout the project.

Initially, a field chemist will identify as much material as possible, using the identification markings which may be present on each container. If no identifying markings are present, the material in the container will undergo fingerprint testing for segregation into compatible groups. Based upon the results of the fingerprint testing, materials will be segregated into one of seven groups:

1) Flammable solids and liquids;
2) Oxidizers;
3) Acids;
4) Bases;
5) Poisons, pesticides, irritants;
6) ORM-E solids and liquids.
7) Explosives

Radioactive, water reactive, air reactive, and shock-sensitive materials will be kept separate from the other lab pack materials and will be handled using methods developed to effectively deal with the specific hazards of each group as specified in Section 3.9.

Once all labpack material has been identified and segregated, the containers will be placed in D.O.T. approved drums for transportation to the disposal facility. Only items of the same category will be placed in a single drum, along with a volume of absorbent material equal to approximately 60% of total drum volume to prevent material contact and to absorb any liquid release which may occur in transit.

A listing of each item is made as it is placed in the particular drum. This packing list is then attached to the drum along with appropriate hazardous waste labels. A copy of this list is also attached to the shipping manifest when the load is transported off the site for disposal. Each drum is numbered and the packing list is numbered to correspond to each drum to assure proper handling of materials both on the project site and at the disposal facility.

3.8 BULK LIQUIDS IN TANKS

There are currently 75 tanks on the Western Processing site. The contents of these tanks will be removed and the tanks themselves may be cut up for transportation and disposal, or cleaned. These operations will be addressed in a later section.

Because the tanks contain volumes of unknown materials, it will be necessary to sample and analyze the contents of each tank. Upon initial opening of tanks, workers shall wear self-contained breathing apparatus and full protective outergarments. When a ladder is required to open a tank, the ladder will be secured at the top. The ladder will not be removed while anyone is working on the tank.

In tank opening operations, personnel will use existing joints, valves, ports, hatches or manways whenever possible and caution will be taken to prevent or minimize release of gases or opening of closed valves if lines have not been drained. Whenever possible, access will be gained from an existing opening or hatch at the top of the tank.

If access cannot be gained in any other fashion, it may be necessary to cut an opening in the tank. In that case, personnel will use the "cold cut" method on the top area of the tank following grounding of cutting equipment and the tank. In that instance, the personnel will cut a small opening in the tank to release pressure and, based upon explosimeter readings, inert gas may be pumped into the tank opening while the remainder of the opening is cut.

During this operation, the work area will be isolated and firefighting equipment will be made available. Non-sparking tools will be used whenever possible. Burning or cutting lines on tanks with unidentified or flammable contents will be prohibited. Provisions will be made for the containment of spills which may occur during opening operations. Once the tanks are opened, sampling activities will be conducted under the protocols set forth in Section 3.3., Sampling Plan. Analysis of the tank contents will be conducted in the mobile laboratory as detailed in Section 3.4. Analytical Plan.

The results of the analyses will be used to determine which materials are compatible for temporary storage, transportation, and final disposal, as well as the most environmentally sound and cost-effective method of treatment and/or disposal of each bulk waste stream.

Compatible liquids will be pumped out of tanks into on-site storage tanks supplied by ENRAC. Free liquids will be pumped from the top of the tank whenever possible using a vacuum truck or stationary pump in order to avoid opening bottom valves to drain tanks because of the danger of valves breaking, not re-sealing, or leaking.

When tanker load quantities have been accumulated, they will be pumped from the on-site storage tanks into vacuum tankers for transportation to the selected disposal facility. Should material which is not compatible for bulking with other materials be encountered, it will be pumped directly from the existing on-site tank to the truck for transportation. Following removal of the liquids, sludges will be removed by vacuum truck, stationary pump or by manual means to the extent practicable. Some tank cutting may be required to make an opening large enough for access to the sludges. Sludges may require addition of sorbent material in order to prepare the material for shipment in bulk. Dependant upon volume, the material may be placed in drums for shipment to the designated disposal facility.

3.9 ON-SITE PROCESSING

3.9.1 General

On-Site processing of waste materials prior to transportation and disposal may be necessary throughout operations. These on-site processes could include solidification, neutralization, and reaction. These on-site processes may require specific permits to be issued by affected agencies. CWM-ENRAC has had successful experience in obtaining these special emergency permits through previous remedial projects.

3.9.2 Solidification

Certain waste materials may require on-site solidification in order to facilitate transportation / disposal. This solidification process may take place in the original ntainer, within another container, within an impoundment, or a stationary vessel. CWM-ENRAC will utilize the available on-site solidification agent and/or off-site material as needed. All solidified material will be sampled and analyzed for disposal site approval prior to transportation

3.9.3 Neutralization

Certain waste materials may require on-site neutralization prior to transportation and disposal. The neutralization process will take place in tanks or storage vessels under carefully controlled conditions. The neutralization agent addition will be used to control the reaction. A CWM-ENRAC chemist will carefully monitor the reaction rate, temperature, off-gassing, and over-pressurization of the vessel. All neutralized material will be sampled and analyzed for disposal site approval prior to transportation.

3.9.4 Reactives

The encountering of water reactives, solid flammables, shock sensitives, and explosives will require special processing prior to transportation and disposal. This processing includes reaction and detonation, in both of which CWM-ENRAC personnel have had extensive experience. The CWM-ENRAC trained personnel will identify any expected reactives, based on technical literature and experience, and direct any material handling during processing. If shock sensitive, explosive, or highly reactive material is discovered on-site, it will be necessary to move the materials to a segregated area while awaiting detonation. On-site detonation is the preferred method of processing because of the great risk to personnel, equipment and the environment if transport of the material off-site is attempted. Additionally, there are few, if any, potential facilities capable of handling this material.

The materials would remain in the segregated area until the site has been cleared of most of its drums, tanks and wastes piles. Once the detonation site has been cleared, CWM-ENRAC will inspect the designated area for adequate clearance from power lines, telephone lines, underground cables and gas mains. All personnel and equipment must maintain an approximate 100 meter distance from the detonation point. Local police and fire departments will be notified prior to demolition and will be requested to be present during actual detonations.

Commercial dynamite of a water-gel base will be used for detonation and a military explosive C-4 will be used for any heavy steel cylinders. The actual demolition operations will be carried out in accordance with U.S. Army ordinance disposal practices. All detonations will be supervised and performed by extensively trained explosive ordinance personnel. Any remaining material after reaction or detonation will be sampled and analyzed for disposal site approval prior to transportation.

3.10 TANK DEMOLITION

Once the bulk liquids and sludges have been removed from the 75 on-site tanks, tank demolition can begin as a follow-on operational phase. Tank demolition procedures will follow a specific operational sequence in order to assure complete safety for personnel during demolition operations. The following paragraphs describe the operational sequence and the protocols that will be applied.

A drawing of each tank will be prepared with attention to support mechanisms, wires, plumbing lines, openings, valves, and vents. Each tank drawing will also document height, width, diameter, construction material, welds, rivets, bolts, pressurization, and suspected or known prior contents. These steps are taken in order to assess expected hazards from which specific demolition procedures will be established and additional safety procedures defined. Numbers will be assigned to tanks to enable easy reference to this data. A "Tank Analysis" form is attached and marked Exhibit 3.10.

Based upon the preceding Tank Analysis procedures, a cutting plan will be developed for each tank. The plan will address specific safety needs, cutting methods, the size of pieces, notation of problem areas and the cutting sequence.

After a tank is reopened following removal of bulk waste, a non-sparking fan will be used to direct fresh air in and force potentially volatile vapors out of the tank. Following that vapor dispersion operation, inert gas or air will be pumped into the tank to force out remaining vapors. Additionally, it may be necessary to blanket tank residuals with foam, absorbent, or water in order to minimize reactivity.

Continuous air monitoring for flammable and toxic contaminants and oxygen content will be conducted during tank demolition operations. If cutting of tanks that contained flammable liquids is required, the minimum safe conditions are satisfied if the oxygen content is below 10% and no flammable vapors (0% LEL) are detected at the site of the cut.

All work on tanks will be done in teams of at least two persons. At least one person is, at all times, assigned to monitor actual tank cutting activities. Conditions in, on and around tanks are continuously monitored for change or reaction. Safety equipment and emergency response equipment will be readily available at all times. Such equipment may include portable high pressure foam dispersion units, mobile firefighting unit, and a high pressure water delivery system.

Cold cutting will be performed on tanks with flammable contents. Cold cutting saws and drills are designed to cut in controlled revolutions to minimize sparking. Hot cutting involves the use of a torch and is used only on tanks with non-flammable contents.

Work on all tanks will be done as close to the ground as possible to minimize the risk of personal injury. One person oversees the instruments, tools, fire equipment and water supply and cools the tank with water as necessary while the other team member is cutting.

Cables will be attached to the tank as necessary and secured by heavy equipment to eliminate toppling of tanks during cutting. When possible, tanks will be laid on their sides before cutting operations begin.

Following the cutting of the tanks, the resulting materials will be loaded into lined vehicles. The vehicles will be tarped; after completion of necessary paperwork and documentation, the trucks will be dispatched to the designated disposal facility.

This system shall apply to those tanks that are not structurally sound. ENRAC proposes an alternate system for those tanks that are deemed structurally sound; specifically, cleaning of the tanks versus demolition and disposal. However, the cost to certify the structural integrity of a tank may be economically prohibitive since such certification could potentially require hydrostatic testing, coupon corrosion analysis, x-ray defraction weld testing and metal thickness testing throughout. It is ENRAC's understanding that U.S.E.P.A. has a listing of tanks that have been sonically tested. That data will be utilized in determining which tanks will be cleaned.

The cleaning operation will involve degassing as previously specified. Following degassing, the tank cleaning process will be accomplished by circulation of chemical cleaning products (i.e., high caustic detergents or emulsion solvents) inside the tanks by the use of a rotojet or similar cleaning device. Tanks will be cleaned to the point where residues are removed and readings register below the lower explosive limit (LEL) when tested with an MSA Explosimeter or equal. Tanks will not be sent for reuse and/or resale without the prior approval of the EPA.

Process piping and equipment will either be removed and disposed of, or, where practical, they will be cleaned by circulation of cleaning products through the system with subsequent water flushing and gas testing. All the chemical cleaning fluids will be collected and transported to the designated disposal facility for treatment and/or disposal as a hazardous waste.

Any tanks found contaminated with PCB's will be decontaminated in accordance with the requirements of 40 CFR Part 761.79 Decontamination or some equivalent USEPA approved method.

WESTERN PROCESSING

EXHIBIT 3.10

TANK ANALYSIS

PROJECT: _____

TANK NUMBER: _____

LOCATION: _____

DIMENSIONS: _____ GENERAL SHAPE: _____

ESTIMATED CAPACITY: _____

CONSTRUCTION MATERIAL: _____

CONSTRUCTION TECHNIQUE (WELDED, RIVETED): _____

PRESSURIZATION: _____

PLUMBING LINES: _____

SUSPECTED CONTENTS: _____

COMMENTS: _____

3.11 EXCAVATION OPERATIONS

Upon completion of representative sampling, analysis, and disposal site approval as described in Sections 3.3 and 3.4, excavation operations will begin.

It is calculated that 30,500 cubic yards of material will be excavated from the Western Processing site, including contaminated soils, waste pile material, and miscellaneous debris. Because the excavation program represents a significant portion of the project, in terms of both project time and commitment of personnel and equipment, CWM-ENRAC has developed a comprehensive operational plan which provides for movement of material safely and efficiently.

The earth-moving equipment selected for this phase of the project has been chosen to yield a high rate of production while having a minimal effect on on-site vehicle traffic. Cycle time, mobility, and load capacities have all been taken into consideration as part of the equipment selection process. Three major pieces of equipment will be used in the removal of bulk solids from the site:

- An End Loader
- A Track Bulldozer
- A Track Backhoe

The end loader will serve as the primary production machine, being used to provide for rapid, uniform loading of transportation vehicles. The bulldozer and backhoe will be used to support the endloader, especially in those areas of the site which are not accessible with the loader. (Equipment may be fitted with fully-enclosed environmental cabs with supplied air system.)

Traffic patterns for the movement of excavation equipment and loading of transport vehicles have been developed to provide for an efficient flow of on-site truck traffic and for rapid transition to alternate loading areas.

If necessary, due to inclement weather, the sequence of areas being excavated may be adjusted to provide for minimal disruption of overall excavation operations and project schedule.

After excavation operations have been completed, the site will be graded, as much as practicable, to minimize the potential for ponding of rainwater and to provide for a single collection point for surface drainage.

3.12 BUILDING DEMOLITION

There are 10 buildings encompassing approximately 128,000 square feet standing on the Western Processing site which will be removed as part of the site mitigation. This phase of the project will be undertaken after the completion of tank removal operations.

Prior to actual building demolition, all piping, electrical connections, and other fixtures will be removed from the buildings and will be disposed of as hazardous waste. Should any vessels or laboratory chemicals be encountered during the removal of interior materials, they will be dealt with according to the procedures set forth in Section 3.10 Tank Demolition, and Section 3.7 Labpack Handling. This removal will provide for actual demolition in as safe and efficient manner as possible.

When interior removal operations have been completed, the backhoe and bulldozer will be used to demolish the building exteriors. During the demolition of building exteriors, on-site water may be used to control dust which may result. Dust control water spraying will utilize a fine mist versus a heavy spray resulting in substantial reduced volumes of water usage. The debris resulting from this operation will be cut so that it may be placed into bulk trailers for transportation to the disposal facility. Concrete which may be left from building foundations will also be removed and the surface area around the buildings will be graded to the surrounding topography to minimize the potential for ponding of rainwater.

3.13 STORM WATER MANAGEMENT

Approximately 600,000 gallons of storm water are accumulated in the central area of the site. This water will be transported to a permitted off-site disposal facility.

A storm water removal program will be initiated during site mobilization activities to insure that the area presently inundated is reasonably available for on-site operations.

Preliminary data received form the EPA shows that the water is contaminated with organics and heavy metals.

To treat storm water accumulated during and subsequent to the surface cleanup work, CWM/ENRAC will utilize its modular wastewater treatment system (MWWTS) for reduction and removal of dissolved hydrocarbons, heavy metals, and suspended solids from the water to meet discharge limits. CWM/ENRAC's MWWTS consists of primary filtration with mixed media for reduction of free oils and solids followed by secondary filtration with granular activated carbon for removal of dissolved organics. The system is totally self supporting and is capable of treating upwards of 250,000 gallons per day.

The treated water will be discharged into the Metro sewer system by permit or discharged to Mill Creek by permit. Based on the permit discharge criteria, treated effluent samples will be composited on a daily basis for analytical comparison to the stated limitations. Untreated contaminated water will alternatively be transported to a permitted off-site disposal facility.

As site activities proceed and general areas of the site are cleared, a phased grading and compacting of the surface (where operationally feasible) shall be undertaken to control storm water. On-site materials may be used and berms and dikes constructed where needed in order to minimize or eliminate surface runoff from the interior of the Western Processing site. Control measures shall be capable of retaining on-site the volume of rainwater that would be generated as a result of a 25 year storm event of 24 hour duration as defined by Technical Paper No. 40, Rainfall Atlas of the United States, published by the Department of Commerce, May 1961.

At the completion of surface removal activities, CWM/ENRAC will perform a final grading of those areas of the site necessary to create the common collection point or points to provide accumulation pond(s) for storm water and prohibit off-site discharge of storm water. All water that is collected within the accumulation pond shall be treated based upon the selected treatment option. This operation will continue until April 1, 1985 and will include pumping down and treating accumulated water before ceasing operation.

The perimeter fence and gates shall be intact at completion of the work.

EA0516

3.14 SPILL RESPONSE AND CONTROL

The ENRAC operations will involve numerous transfers of liquids from containers presently on-site to either interim bulk storage tanks or directly to the bulk liquid transport vehicles. These transfers, coupled with the questionable integrity of the on-site containers (drums and tanks), require that guidelines for safe and practical response to hazardous waste spills.

ENRAC will develop a specific spill response program to be implemented at the initiation of the Western Processing surface remedial action and continued throughout the duration of ENRAC's involvement at the site. This program will address all phases of materials which may be encountered.

Concurrent to the clean-up activities, the site Safety Representative, on-site Chemist and Project Manager will evaluate the magnitude of any spillage and determine if the degree of resultant hazard warrants work stoppage. The Project Manager will be informed of any situation as soon as possible.

In the event of an incident, the Safety Representative will determine the extent of the problem. He will record the nature of the chemicals involved if a determination is possible. A fingerprint analysis may be necessary and, if so, it will be performed immediately. If he decides that site evacuation is required he will implement the worksite evacuation system. If necessary, he will make arrangements to obtain special equipment to contain and clean up the spill. The Safety Representative will determine the potential for fire associated with the spill and if neighborhood evacuation is necessary.

Once the basic determinations have been made, the spill response coordinator directs the spill response. Personnel will wear protective clothing and equipment for the particular chemical hazards involved.

Spill response equipment will be present on-site and operational in case of a spill. A contingency plan will be developed to react to potential spills. The plan will be approved by the Project Manager, site Safety Representative, and Environmental Management Department and distributed to the appropriate personnel.

In general, a liquid spill is contained by surrounding the spill with walls of absorbant. In the event of a large spill, earth berms may be constructed around the spill. The spill must be prevented from entering surface water or sewer drainage systems. The goal of containment is to minimize contamination.

If possible, the spill should be drained and processed in a nearby low area or pond. Vacuum trucks and tanks may be necessary to drain the spill depending on the magnitude.

Should a spill drain into a waterway, the liquid will be vacuumed by a tank truck or dammed to prevent further contamination. The material from the surrounding area will be removed for disposal after spill containment. Routine reporting procedures will be followed in the event of a spill or release.

In the event of a gas leak from a cylinder, personnel will immediately evacuate the area. The area will be cleared or, if in one of the buildings at Western Processing, the room will be sealed off to prevent gas from escaping to other parts of the building. Outside windows are opened in order to ventilate the room.

The response coordinator will direct personnel to attempt to seal the leak using various tools in the spill response kit. If the cylinder cannot be sealed, the cylinder will be safely shuttled outside to an isolated area or treated, if possible. Care will be taken to avoid breaking the valve or the gas container.

WESTERN PROCESSING

DATE: __/__/__ TIME: _____

LOCATION OF SPILL:

_____

_____

DESCRIPTION OF SPILL:

_____

_____

ACTION TAKEN:

_____

_____

_____

PERSONNEL INVOLVED: _____

_____

EQUIPMENT INVOLVED: _____

_____

SPILL REPORTED TO:

_____

_____

AUTHORIZATIONS:

_____ _____

Spill Response Coordinator EPA Representative

_____ _____

Project Manager Other Authorized Signature

EA0519

In the event of a solid spill, the material will be appropriately moved into an overpack or other suitable container and labeled. The contaminated area surrounding the spill will either be treated or excavated. The spread of contaminated dust will be prevented by covering or wetting the material, depending upon the size of the spill.

Contact with the material will be avoided and proper safety precautions will be followed.

Upon completion of the cleanup, the Safety Representative will complete an incident report conforming to the CWM incident reporting procedure. The report should include a description of the spill (i.e. what spilled, why, etc.), size of the spill, action taken (including equipment and methods used), local entities contacted, and personnel involved. The report will be signed by the Safety Representative and reviewed and signed by the Project Manager.

Copies of the report will be distributed according to CWM incident reporting procedures. A file of incident reports will be maintained on site.

3.15 QUALITY ASSURANCE/AUDIT DOCUMENTATION

The following documents are presented as a sample of the documentation associated with the Quality Assurance Program which CWM-ENRAC has developed for work on hazardous waste site mitigation projects. The audit items cover all factors which are critical to successful project completion and provide CWM-ENRAC management with accurate information for effective project control. This information also helps to provide a foundation from which many project policy decisions may be made. The Quality Assurance Program is developed on a project-specific basis; audit items may be added or deleted based upon the characteristics and requirements of the project.

QUALITY ASSURANCE PROJECT PLAN

BY

CHEMICAL WASTE MANAGEMENT, INC.

ENVIRONMENTAL REMEDIAL ACTION DIVISION

APPROVED: _____

_____

CHEMICAL WASTE MANAGEMENT, INC.

_____

_____

_____

EA0522

(TYPICAL)

AUDIT CHECK LIST FOR VISITOR PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Is there a guard on duty?	___	___
2. Is the guard post sign in book complete?	___	___
3. Does the guard post call for permission to allow visitors to enter the site?	___	___
4. Are visitors issued name tags?	___	___
5. Do all visitors sign visitor release forms?	___	___
6. Are visitor release forms being kept in the central files?	___	___

General Audit Comments: _____

_____

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SIGNATURE _____

DATE _____

PROCEDURES TO BE AUDITED

A) SAFETY PROCEDURES

B) SECURITY PROCEDURES

C) ORGANIZATION PROCEDURES

D) REPORTING PROCEDURES

E) CORRESPONDENCE CONTROL PROCEDURES

F) DAILY ACTIVITY REPORTING PROCEDURES

G) WEEKLY REPORTING PROCEDURES

H) MEETING NOTETAKING PROCEDURES

I) WEEKLY PROGRESS MEETING PROCEDURES

J) ACTION ITEM AUDIT PROCEDURES

K) VERBAL INSTRUCTION PROCEDURES

L) DAILY PROCEDURES

M) VARIANCE PROCEDURES

N) CHAIN OF CUSTODY PROCEDURES

O) TRANSPORTATION PROCEDURES

P) TREATMENT AND DISPOSAL PROCEDURES

Q) AIR MONITORING PROCEDURES

R) COMPLETION OF WORK PROCEDURES

S) PUBLIC RELATIONS PROCEDURES

T) HANDLING OF RESIDENT COMPLAINT PROCEDURES

U) VISITOR PROCEDURES

V) PHOTOGRAPHIC RECORD PROCEDURES

AUDIT CHECK LIST FOR SAFETY

AUDITOR _____ DATE _____

NOTE: Auditor should put written comments under each audit item stating degree/level of compliance with required ENRAC procedures.

1) Develop written Standard Operating Procedures specific to site.

2) No smoking signs.

3) Enforce: Hand washing, face washing and fresh Tyvex suit before lunch.

4) Enforce shower after workday.

5) Develop and document a Site Specific Safety Plan.

6) Document arrangements for emergency procedures.

7) Purchase special equipment and establish procedures for communications in emergencies.

8) Get Safety Meeting documentation and initial training records on file at the site.

9) Buddy System; Establish for all employees except equipment operators.

10) Document all training including that for local labor. Establish and implement training requirements for each job.

11) Store medical records for duration of employment; to be kept for 30+ years.

12) Establish the site specific exclusion areas, contamination reduction areas, and support areas. Include them in the site specific safety plan.

EA0525

13) Purchase monitoring equipment and use to define areas and operations that require specific classes of personal protective equipment.

14) Monitor air contaminants in the command post - support areas. Use OVA and charcoal tubes. Document that air contaminant concentrations are not exceeding safe levels. Establish that these can be safely evacuated in case of a fire or explosion.

15) To reduce the possibility of exposure to organic vapors, work with operations to:

    1. Eliminate standing pools of leaked or spilled wastes.

    2. Arrange work according to wind direction, where feasible. Work upwind of sources in the immediate area and upwind of all waste containers and handling operations.

    3. Station a continuous monitor (OVA) in an appropriate downwind location.

16) Establish which employees will have two-way radio equipment.

17) Document the physical fitness of each employee.

18) Authorize scheduled work breaks morning and afternoon for proper stress relief.

19) Document visitors' trips to controlled areas and verify training.

20) Adopt CWM respirator program in full.

21) Use film badges for radiation monitoring, as required.

22) Identify ENRAC employees, temporary employees and visitors visibly.

23) Are the procedures for decontamination of heavy equipment followed?

24) Establish all records as specified in S.O.P.

25) Verify, train, and test all personnel for emergency procedures. Document.

26) Pre-operation inspection of equipment.

GENERAL AUDIT COMMENTS: _____

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_____

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SIGNATURE _____

DATE _____

EA0527

AUDIT CHECK LIST FOR CHAIN OF CUSTODY

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Are drums numbered sequentially before being opened?	___	___
2. Are sample jars numbered to match drums from which sample is taken?	___	___
3. Are sample jars labeled properly?		
1. Date/Time	___	___
2. Location	___	___
3. Samplers Name	___	___
4. Number	___	___
4. Is the Chain of Custody document filled in properly with all appropriate signatures?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0528

AUDIT CHECK LIST FOR DAILY ACTIVITY REPORTING

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Do all necessary daily reports exist?	___	___
2. Do reports appear to be completed on a daily basis? E.M.D. reports on a weekly basis?	___	___
3. Are all daily/weekly reports complete?	___	___
4. Is the Daily Report Checklist complete?	___	___
5. Are permanent files complete and up to date?	___	___
6. Does the Project Manager receive copies of all daily/weekly reports?	___	___
7. Have items in the "Questions/Items to be Followed-up"sections been addressed by appropriate parties?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

AUDIT CHECK LIST FOR CORRESPONDENCE CONTROL PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Does all incoming correspondence have a communication control number assigned to it?	___	___
2. Is all incoming correspondence logged in the communication log?	___	___
3. Is all internally generated correspondence assigned a communication control number?	___	___
4. Is all internally generated correspondence logged in the communication log?	___	___
5. Can logged entries be found in the files?	___	___
6. Are all correspondence files centrally located?	___	___
7. Are action items being prepared for all correspondence requiring them?	___	___

General Audit Comments: _____

_____

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SIGNATURE _____

DATE _____

EA0530

AUDIT CHECK LIST FOR ORGANIZATION PROCEDURE

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Does an organization chart exist for the project?	___	___
2. Is the organization chart complete?	___	___
3. Are resumes for all appropriate personnel on file with the chart?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0531

AUDIT CHECK LIST FOR PHOTOGRAPHIC RECORD PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Has the Project Manager assigned a photographer from the project team?	___	___
2. Does the photographer and the Project Manager review all pictures?	___	___
3. Are pictures properly cataloged and filed?	___	___
4. Has a script been prepared in sequence with the photo'/slides for presentation purposes on a current basis?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

AUDIT CHECK LIST FOR PUBLIC RELATIONS

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Is the Project Manager or some other employee responsible for public relations?	___	___
2. Are public relation related questions and situations referred to the Project Manager?	___	___
3. Are all site tours guided under the supervision of the Project Manager?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0533

AUDIT CHECK LIST FOR COMPLETION OF WORK

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Upon completion of the work, have the appropriate parties been notified within the alloted time frame?	___	___
2. Have any disagreements to the completion of work been handled in accordance with the procedures?	___	___
3. Is all written notification present in the central file?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0534

ACTION ITEM AUDIT CHECKLIST

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Are all action items properly recorded?	___	___
2. Have action items been copied and received by appropriate parties responsible for their completion?	___	___
3. Have status check dates been adhered to?	___	___
4. Are completed action items properly documented?	___	___
5. Have open action item reports been prepared on a weekly basis, and forwarded to the project manager?	___	___
6. Are action item permanent files complete and up-to-date?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0535

AUDIT CHECK LIST FOR AIR MONITORING

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Is air monitoring of the site completed prior to the daily commencement of work?	___	___
2. Are strip charts read at the close of each day?	___	___
3. Are records kept and reports made on a daily basis in the required log?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0536

AUDIT CHECK LIST FOR MEETING NOTES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Is responsibility for meeting notes assigned at the beginning of each meeting?	___	___
2. Is necessary information complete on all meeting notes?	___	___
3. Does the project manager review and approve meeting notes?	___	___
4. Are copies of meeting notes being kept in the central file?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0537

AUDIT CHECK LIST FOR TREATMENT AND DISPOSAL

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Are managers of disposal facilities contacted, given analysis results of composite load samples?	___	___
2. Are approvals obtained, appropriately logged prior to transport perparation?	___	___
3. Are manifests being filled out accurately and completely, including appropriate signatures?	___	___
4. Are special treatment and disposal procedures being appropriately noted?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0538

AUDIT CHECK LIST FOR TRANSPORTATION PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Are vehicles being inspected to insure compliance with all applicable regulations?	___	___
2. Are drivers properly preparing their vehicle to load?	___	___
3. Are all loads being properly tarped prior to leaving the site?	___	___
4. Are manifests being properly completed?	___	___
5. Are the trucks properly placarded?	___	___
6. Is the on-site administrator notifying the proper authorities of all transportation operations and incidents?	___	___

General Audit Comments: _____

_____

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SIGNATURE _____

DATE _____

EA0539

3.17 DEMOBILIZATION

At the completion of the Western Processing project, CWM-ENRAC will demobilize all equipment and personnel remaining on the project site.

All equipment which has operated in the contaminated areas of the site will be thoroughly decontaminated prior to removal from the site. All material generated from this decontamination process will be containerized and disposed of as hazardous waste.

Within 60 days after project completion, CWM-ENRAC will submit a final report which will detail all activities associated with implementation of the project.

This will include:

1) Analytical Summary - summary of results of all sample analyses.

2) Transportation Log - Summary of all transportation activities, including track numbers, manifest numbers, and number of loads.

3) Disposal Report - Complete record of all disposal activities, including manifest numbers, and disposal destinations.

4) Daily Log - A daily recording of all project activities, including tasks accomplished, equipment usage, and specific problems encountered along with solutions implemented.

A summary of this report will be presented to the Generator's Group at a post project meeting.

AUDIT CHECK LIST FOR VERBAL INSTRUCTION PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Are verbal instructions being documented on the verbal instruction form?	___	___
2. Is the Project Manager reviewing and approving all verbal instruction forms?	___	___
3. Are all forms signed by the Project Manager	___	___
4. Are all forms signed by authorized outside parties?	___	___
5. Are the central files complete with respect to verbal instruction forms?	___	___

General Audit Comments: _____

_____

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_____

SIGNATURE _____

DATE _____

AUDIT CHECK LIST FOR WEEKLY PROGRESS MEETING PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Have the meeting procedures been established?	___	___
2. Have all attendees been notified in writing of the above procedures?	___	___
3. Has an agenda been developed for each meeting?	___	___
4. Has someone been assigned to take meeting notes?	___	___
5. Are the meeting notes handled in strict adherence to the meeting notes procedures?	___	___
6. Are the central files complete with respect to meeting notes?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0542

AUDIT CHECK LIST FOR WEEKLY REPORTING PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Is the O.S.A. preparing a weekly summary of Daily Activity Reports?	___	___
2. Is the weekly summary of Daily Activity Reports prepared in a timely manner?	___	___
3. Is the Project Manager preparing a Weekly Management Report?	___	___
4. Is the Weekly Management Report prepared in a timely basis?	___	___
5. Are the control files complete with respect to eekly Reports?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0543

AUDIT CHECK LIST FOR REPORT PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Is the on-site controller preparing Weekly and Monthly Activity Reports?	___	___
2. Is the Project Manager preparing a complete internal Weekly and Monthly Report?	___	___
3. Is the Project Manager preparing a complete external Weekly and Monthly Report?	___	___
4. Are the appropriate parties recieving Weekly and Monthly Reports?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

EA0544

AUDIT CHECK LIST FOR PROCEDURES FOR HANDLING RESIDENT COMPLAINTS

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Are all resident complaints initially referred to the USEPA and/or State?	___	___
2. Does the Safety Supervisor respond to all complaints referred to him by the USEPA and/or State?	___	___
3. Are all responses to complaints documented in the Safety Activity reports on the day they are conducted?	___	___

General Audit Comments: _____

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SIGNATURE _____

DATE _____

AUDIT CHECK LIST FOR VARIANCE PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Are employees recognizing variance items and documenting them?	___	___
2. Are variance items being documented properly?	___	___
3. Are all variance items referred to the Project Manager?	___	___
4. Are variance items requiring further processing being sent to CWM Legal?	___	___
5. Are variance items sent to CWM Legal logged properly?	___	___
6. Are variance items being reported and documented to USEPA and/or State?	___	___

General Audit Comments: _____

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_____

SIGNATURE _____

DATE _____

AUDIT CHECK LIST FOR DELAY PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Have there been any "excusable delays"? (If no, sign and date if yes proceed)	___	___
2. Have "excusable delays" been addressed by the Project Manager and CWM Legal Department?	___	___
3. Has USEPA and State, been issued written notification?	___	___
4. Are central files complete with respect to "excusable delays"?	___	___

General Audit Comments: _____

_____

_____

_____

_____

_____

SIGNATURE _____

DATE _____

AUDIT CHECK LIST FOR SECURITY PROCEDURES

AUDITOR _____ DATE _____

AUDIT POINT	Yes	No
1. Is a guard service employed for round-the-clock protection at the site?	___	___
2. Is a log book maintained for all personnel on the site?	___	___
3. Is the guard making periodic inspections of the site during non-operational hours?	___	___
4. Are all irregularities reported immediately?	___	___

General Audit Comments: _____

_____

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_____

SIGNATURE _____

DATE _____

3.16 COMMUNITY RELATIONS

ENRAC is keenly aware of the need for a well designed community relations program in all hazardous waste site cleanups. This is especially true in the case of the Western Processing Project. As a result, ENRAC has prepared a specific support program to aid in implementing a community relations program.

Areas of community relations support that can be provided by ENRAC include, but are not limited to:

(1) Design of a community relations plan to address community concerns and provide a dialogue and information exchange among all persons interested in the project.

(2) Submission of timely and readily understandable briefing material for local officials, citizens, and the media. Such materials will include progress updates, periodic fact sheets, or other site specific material suitable for distribution to concerned or interested parties of the local communities.

(3) Preparation of a 35 mm slide presentation and script on the cleanup that will be continually updated throughout the project and made available for presentation at local community or civic group functions.

(4) Availability of ENRAC Project Manager, Corporate Community Relations Manager, and other technical staff for participation at scheduled community meetings. This participation will involve assistance in responding to technical questions regarding the project, or additional involvement as deemed appropriate.

(5) Provision of background material and technical data on ENRAC itself and specific project personnel for use as required.

In addition to the above community relations support, ENRAC will construct a viewing platform for official use in providing visitors and scheduled media tours a suitable place from which to safely view site activity. The visitors' platform will be located outside of the site "hot line" away from field operations. Construction will be accomplished during the site mobilization phase. This platform will be equipped with a wind sock to alert personnel as to the wind direction. In addition, air monitoring may be performed, should the on-site Safety Representative suspect elevated levels of VOC's in the platform area. The viewing platform will also be monitored to prevent its unauthorized use.

In past projects, CWM-ENRAC has found that construction of a viewing platform provides a very effective "focal point" that will accommodate visitor interest and control visitor activities and access to unauthorized areas.

These described activities only suggest possible ways in which we can provide support in community relations activities. We shall, however, make our community relations resources available in whatever capacity and degree appropriate.

SECTION IV SAFETY

I. Introduction

A. Overview

The Western Processing Company, Inc. site, covering approximately thirteen acres in Kent, Washington, was used to recycle, reclaim, treat and dispose of numerous industrial wastes, including waste oils, electroplating wastes, waste pickle liquor, battery acids, steel mill flue dusts, pesticides, spent solvents, and zinc dross. Many hazardous materials have been found on or below the site and include: benzene, chloroform, toluene, phenol, arsenic, lead, chromium, cadmium, mercury, cyanides, poly-nuclear aromatic compounds, and several chlorinated hydrocarbons including PCBs.

ENRAC site operations can be expected to include draining and removal of storage tanks, sampling and repackaging of drummed liquids, and excavation of contaminated debris and soil. Due to the nature of the waste material, the condition of containers and storage vessels, and the extent of contamination on-site, the chemical exposure potential must be considered extreme. It is expected that a minimum of Level C protection will be required for most site operations, although Level B protection may be required for several tasks. Protective apparel providing specific protection for chlorinated hydrocarbons (permeation hazard) will be required.

Other hazards likely to be encountered during site operations may include physical hazards from slipping and tripping, earth moving during excavation, and climatic stressors such as high ambient temperatures and high humidity.

B. Purpose and Scope

This health and safety plan is intended to prescribe minimum procedural and equipment requirements for worker protection. Operating conditions can be expected to change as the work progresses, requiring some modification of the plan. As appropriate, addenda will be provided by the CWM-ENRAC Site Safety Officer and/or the Health and Safety Manager. The plan is designed to comply with established CWM-ENRAC policies and procedures, and applicable state and federal OSHA regulations. Therefore, no changes to the plan will be authorized without prior approval of the ENRAC Health and Safety Department. All CWM-ENRAC site personnel, site visitors, and subcontractor personnel are subject to the provisions of this directive.

II. Medical Surveillance

A. Examination Requirements

All CWM-ENRAC personnel on-site shall have successfully completed a preplacement or annual periodic/update medical examination in accordance with established CWM-ENRAC policies and procedures, and consistent with the provisions of the OSHA carcinogen standards. This examination shall include a complete medical and occupational history, physical examination, and selected biological sampling. Laboratory studies include a complete blood count (CBC); urine analysis; chemistry panel (SMAC); pulmonary function testing (FEV, and FVC); chest X-ray (PA); audiometry; and vision screening. Additional tests are conducted as deemed appropriate by the occupational physician. Ongoing medical consultation and post-project testing will be provided.

B. Medical surveillance for subcontractor and/or transportation shall be consistent with the requirements of Section A. above.

C. Emergency Medical Treatment

In the event of an employee injury or illness requiring emergency medical care beyond the capabilities of on-site CPR and first-aid trained personnel, the following resources will be utilized as appropriate:

1. Valley General Hospital
   16200 85th Street West
   Renton, Washington
   (206)244-9970

2. State Highway Patrol
   State of Washington
   911

3. Fire/Paramedic Squad
   911

EA0554

III. EMPLOYEE TRAINING AND INFORMATION

A. All ENRAC site personnel shall have completed the Basic Hazards Awareness Course provided by the ENRAC Health and Safety Department. This coursework is a combination of formal classroom training, practical exercise, and written and practical performance evaluation. This formal training is augmented by daily crew briefings and site specific training as required. All subcontractor personnel will be required to complete the Basic Hazards Awareness Course and attend all crew briefings.

B. Site personnel shall be required to complete the Arsenic and Lead Health Hazards training courses, in accordance with the requirements of ENRAC Safety Procedures 0541 and 0542. (Exhibit A). In the event that specific organic/inorganic compounds and/or substances are encountered during site operations which mandate additional employee training, such training will be conducted in accordance with ENRAC's Safety Procedures.

C. A completed Material Safety Data Sheet, prepared in accordance with established CWM-ENRAC procedures, for each hazardous substance or hazardous mixture likely to be encountered at the site, shall be available at the Command Center for employee review.

IV. AIR QUALITY MONITORING PROGRAM

A. General

An air quality monitoring program shall be implemented to provide baseline and on-going air quality data for site operations. The program shall include as a minimum, the following:

1. A preliminary survey of existing air quality conditions, prior to any surface disturbances and, if possible, under anticipated "worst case" weather conditions (hot, dry and stagnant), to be used to establish baseline levels for input into the respiratory protection selection process;

2. An on-going evaluation of on-site atmospheric contaminant concentrations during site remediation activities that involve significant surface disturbances; and

3. Perimeter monitoring of off-site downwind air quality conditions during significant surface disturbances.

B. Specific Site Sampling Requirements

1. Industrial Hygiene Sampling

Representative personnel exposure monitoring, to determine eight-hour time weighted average (TWA) exposure concentrations shall be conducted as deemed appropriate by the Site Safety Officer or his designees. Sampling methods, analytical procedures, and sampling frequencies shall be consistent with OSHA and NIOSH requirements and established CWM-ENRAC policies and procedures.

2. Regular Review of Selected Level of Protection

The site Safety Officer will compare the monitoring results on a regular basis with the OSHA standard to insure that the selected level of protection is appropriate.

3. Off-Site Monitoring

When ambient air monitoring on the downwind edge of the site indicates higher than baseline levels of any contaminant, immediate steps shall be taken to determine the cause, make changes to site operations, warn unprotected personnel and initiate evacuation procedures if necessary. Specific procedures to be implemented shall be determined by the site Safety Officer and Project Manager for each incident.

V. GENERAL SAFE WORK PRACTICES

A. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of material is prohibited in any area where the possibility of contamination exists.

B. Hands must be thoroughly washed upon leaving a contaminated or suspected contaminated area before eating, drinking, or any other activities transpire.

C. Thorough washing of the entire body should be accomplished whenever decontamination procedures for outer garments are in effect. The washing should occur as soon as possible after the final wearing of protective garments.

D. Legible and understandable precautionary labels shall be prominently affixed to containers of raw materials, intermediates, products, mixtures, scrap, waste, debris, and contaminated clothing.

E. Contaminated protective equipment shall not be removed from the regulated area until it has been cleaned or properly packaged and labeled.

F. Removal of materials from protective clothing or equipment by blowing, shaking, or any other means which may disperse materials into the air is prohibited.

G. Daily inspections of excavations shall be made. If there is evidence of possible cave-in or slides, all work in the excavation shall cease until the necessary safeguards have been taken.

H. Portable or fixed emergency shower/eyewash stations shall be strategically located throughout the regulated area.

I. A deluge shower or hose and nozzle shall be available if needed in the Contamination Zone to wash down heavily contaminated personnel before removing protective clothing.

J. All trenching and excavation work will comply with regulatory agency rules.

K. The walls and spaces of all excavations and trenches more than 5 feet deep and into which employees will enter shall be guarded by shoring, sloping of the ground (1:1), or some other equivalent means.

L. All entries by workers into trenches or excavations greater than five feet deep are subject to the provisions of CWM-ENRAC Confined Space Entry Procedures.

M. Trenches more than five feet deep shall have ladders or steps located so as to require no more than 25 feet of lateral travel between means of egress.

N. All trenches shall be backfilled as soon as practical after work is completed and all associated equipment removed.

O. Personnel on-site must use the "buddy" system when wearing any respiratory protective equipment. Communications between members must be maintained at all times. Emergency communications should be prearranged in case of radio breakdown or lack of radios. Visual contact must be maintained between "pairs" on-site and each team should remain in close proximity to assist each other in case of emergencies.

P. Personnel should be cautioned to inform each other of subjective symptoms of chemical exposure such as headache, dizziness, nausea, and irritation of the respiratory tract, eyes, or skin.

Q. No excessive facial hair which interferes with a satisfactory fit of the mask-to-face seal, will be allowed on personnel required to wear respiratory protective equipment.

R. All respiratory protection selection, use, and maintenance shall meet the requirements of established CWM-ENRAC procedures, recognized consensus standards (AIHA, ANSI, NIOSH), and shall comply in all respects to the requirements set forth in 29 CFR 1910.134.

S. Appropriate work areas for support, contamination reduction and exclusion will be established.

T. ENRAC personnel on-site are to be thoroughly briefed on the anticipated hazards, equipment requirements, safety practices, emergency procedures and communications methods, initially and in daily briefings.

U. Any skin contact with surface and groundwater shall be avoided.

V. Steel toe and shank neoprene boots will be worn on-site at all times.

W. The ambient temperature will be monitored and the necessary controls to reduce employee heat or cold stress will be implemented.

X. As appropriate, equipment on-site shall be bonded and grounded, spark proof, and explosion resistant when handling flammable liquids.

Y. A sufficient number of multi-purpose portable fire extinguishers shall be strategically located throughout the work area so as to limit the travel distance to less than 50 linear feet.

Z. Heat Stress Control:

Adverse climate conditions, primarily heat, are important considerations in planning and conducting site operations.

The effects of ambient temperature can cause physical discomfort, loss of efficiency, personal injury, and increased accident probability. In particular, heat stress due to protective clothing decreasing body ventilation will be an important factor. One or more of the following recommendations will help reduce heat stress. Their applicability is dependent on the climatic conditions during the ongoing operations.

1. Provide plenty of liquids to replace loss of body fluids. Employees must replace water and salts lost from sweating. Use either a 0.1% salt water solution, more heavily salted foods, or commercial mixes such as Gatorade. The commercial mixes will be provided for all employees.

2. Establish a work schedule that will provide sufficient rest periods for cooling down. This will require shifts of workers when wearing encapsulating suits and SCBA.

3. Cooling devices, such as vortex coolers and cool vests, may be worn under suits if conditions of excess heat buildup are encountered.

4. Establish work regimens consistent with ACGIH Guidelines.

5. To assist in determining the body's recuperative ability to excessive heat, one or more of the following monitoring techniques should be used as a screening mechanism for determining recovery. Monitoring of personnel should commence at least when the ambient temperature increases or as monitoring indicates slow recovery rates (after every work period above 85°).

    a. Heart Rate (HR) should be measured by the radial pulse during 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is in excess of the above value, the next work period should be shortened

by 10 minutes (or 33%) while the length of the rest period stays the same. If the pulse rate is in excess of 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%.

b. Body Temperature (BT) should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature should not exceed 99.7°F (corresponding to 100.4°F BT). If OT exceeds 99.7°F, the next work period should be shortened by 10 minutes (or 33%) while the length of the rest period stays the same. However, if the OT is in excess of 99.7°F at the beginning of the next rest period, the following work cycle should be further shortened by 33%. OT should be measured again at the end of the rest period to make sure that OT has decreased below 99.7°F.

c. Body Water Loss (BWL) due to sweating during the work day should be measured by the difference between body weight in the morning before work and body weight in the evening after finishing work. The clothing worn should be similar at both weighings; preferably the worker should be nude. The scale should be accurate to ±½ lb. BWL should not exceed 1.5% of total body weight. If BWL exceeds 1.5%, the worker should be instructed to increase his daily intake of fluids by the amount of total deficit (morning body weight minus evening body weight). The ideal condition is to maintain the body fluids at a constant level during the whole work day. This requires the replacement of the salt lost in the sweat as well. This can be achieved by eating salted meals during the day and/or drinking fluids containing 0.1% salt.

VI. PERSONAL PROTECTIVE EQUIPMENT

A. Introduction

It is important that personal protective equipment and safety requirements be appropriate to protect against the potential hazards at the site. Protective equipment will be selected based on the contaminant type(s), concentration(s), and routes of entry. In situations where the type of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the personal protective equipment.

B. Levels of Protection

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.

Level B: Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required.

Level C: Should be selected when the type(s) of airborne substance(s) is(are) known, the concentration(s) is(are) measured, and the criteria for using air-purifying respirators are met.

Level D: Should not be worn on any site with respiratory or skin hazards. Is primarily a work uniform providing minimal protection.

C. Required Protection

ENRAC will provide its employees with appropriate personal protective equipment as required. Only NIOSH/MSHA certified respiratory protective equipment will be utilized.

Respiratory protection as specified in the OSHA standards shall be provided (Exhibit A). Protective clothing for site operations must provide vapor and liquid barrier protection against chlorinated hydrocarbons.

VII. WORK ZONE AND DECONTAMINATION PROCEDURES

A. General

A site must be controlled to reduce the possibility of exposure to any contaminants present and their transport by personnel or equipment from the site.

A control system is required to assure that personnel and equipment working on the hazardous waste site are subjected to appropriate health and safety surveillance.

The possibility of exposure or translocation of contaminants can be reduced or eliminated in a number of ways, including:

- Setting up security or physical barriers to exclude unnecessary personnel from the general area.
- Minimizing the number of personnel and equipment on-site consistent with effective operations.
- Establishing work zones within the site.
- Establishing control points to regulate access to work zones.
- Conducting operations in a manner to reduce the exposure of personnel and equipment.
- Minimizing the airborne dispersion of contaminant(s).
- Implementing appropriate decontamination procedures.

B. Field Operations Work Areas

Work areas (zones) will be established based on anticipated contamination. Within these zones prescribed operations will occur

utilizing appropriate personal protective equipment. Movement between areas will be controlled at checkpoints. The planned zones are:

1. Exclusion Area (contaminated);
2. Contamination Reduction Area; and
3. Support Area (non-contaminated).

1. Exclusion Area

The Exclusion Area is the innermost area of three concentric rings and is considered contaminated, dirty or "hot". Within this area, prescribed protection must be worn by any entering personnel. An entry checkpoint will be established at the periphery of the Exclusion Area to control the flow of personnel and equipment between contiguous zones and to ascertain that the procedures established to enter and exit the zones are followed. The Exclusion Area boundary will be established initially based on the presence of the contaminant(s) within the area. Subsequent to initial operations the boundary may be readjusted based on observations and/or measurements. The boundary will be physically secure and posted.

2. Contamination Reduction Area

Between the Exclusion Area and the Support Area is the Contamination Reduction Area. The purpose of this zone is to provide an area to prevent or reduce the transfer of contaminants which may have been picked up by personnel or equipment returning from the Exclusion Area. All decontamination activities occur in this area.

The boundary between the Support Area and the Contamination Reduction Area is the contamination control line. This boundary separates the possibly-contaminated area from the clean zone.

Entry into the Contamination Reduction Zone from the clean area will be through an access control point. Personnel entering at this station will be wearing the prescribed personal protective equipment for working in the Contamination Reduction Area. Exiting the Contamination Reduction Area to the clean area requires the removal of any suspected, or known, contaminated personal protective equipment and compliance with decontamination procedures.

3. Support Area

The Support Area is the outermost of three rings and is considered a non-contaminated or clean area. It contains the Command Post (CP) for field operations and other elements necessary to support site activities. Normal street or Level D work clothes are the appropriate apparel within this zone.

C. Zone Dimensions

Considerable judgement is needed to assure safe working distances for each zone, balanced against practical work considerations. Physical and topographical barriers may constrain ideal locations. Field/laboratory measurements combined with meteorological conditions and air dispersion calculations will assist in establishing the control zone distances.

D. Decontamination Procedures

1. Introduction

As part of the system to prevent or reduce the physical transfer of contaminants by people and/or equipment from on-site, procedures will be instituted for decontaminating anything leaving the Exclusion Area and Contamination Reduction Area. These procedures include the decontamination of personnel, protective equipment, monitoring equipment, clean-up equipment,

etc. Unless otherwise demonstrated, everything leaving the Exclusion Area should be considered contaminated and appropriate methods established for decontamination. In general, decontamination at the site consists of rinsing equipment, personnel, etc., with copious amounts of water and washing the same with detergent water solution.

2. Procedure

   a. Personnel equipment worn into the Exclusion Area will be decontaminated upon leaving the Contamination Reduction Area. All equipment decontaminated will be air dried.

   b. The decontamination of equipment, material and personnel used or working in the Contamination Reduction Area may be somewhat less complex than that used within the Exclusion Area.

   c. The spent solution, brushes, sponges, containers, stands, etc., used in the decontamination process must, until shown otherwise, be considered contaminated and must be properly disposed.

VIII. EMERGENCY RESPONSE PLAN

A. Site Emergency Warning System

Several warning systems may be utilized depending on the worksite conditions or emergency involved:

1. Verbal communications
2. Verbal communications assisted with a bull horn
3. Verbal communications assisted with a site PA system
4. Radio communications
5. Vehicle horns
6. Portable hand-held compressed gas horns

Verbal instructions with or without assistance are used to deal with specific incidents.

Radio communications are used on-site to give instructions and directions. Emergency radio communications are prefixed as such and have priority over operations communications.

Horn signals are used to signify an emergency warning.

One long blast is used on-site to signify emergency evacuation of the immediate work area to a predetermined location upwind, where a head count will be taken and further instructions given.

Repeated short blasts are used on-site or from off-site to signify evacuation of all personnel from the site to the hot line where further instructions will be given after a head count is taken.

B. Emergency Equipment

The following equipment shall be available at the work site:

1. Fire extinguishers - dry chemical
2. First aid kits (including chemical burn kit)
3. Emergency oxygen kit
4. Emergency shower kit (pressurized)
5. P.D.T. (personal decontamination trailer)
6. Non-sparking tool kit
7. Fire Blankets
8. Litters
9. Portable two-way radio equipment
10. Combustible gas and oxygen detector alarm.
11. Organic vapor detection instruments - HNU photoionizer detector or Foxboro Analytical (formerly Century Systems) OVA
12. Inorganic vapor detector tubes and air supply pumps - Draeger and/or MSA
13. Hand-held compressed gas horns
14. Bull horns
15. Appropriate spill cleanup supplies and equipment

C. General Emergency Procedures

In case of an emergency or hazardous situation, the team member that observes this condition shall immediately give the alarm.

1. Upon hearing an alarm, all non-emergency communications will cease and the member giving the alarm will proceed to give the Project Manager all pertinent information.

2. Actions to be taken will be dictated by the emergency.

3. Power equipment will be shut down and operators will stand by for instruction.

4. Injured personnel will be transported to the Personnel Decontamination Trailer (PDT).

5. CWM-ENRAC Command Post (CP) will be notified immediately.

6. In case of a fire, explosion or hazard alarm, individuals will proceed immediately to assigned pre-located safe sites.

7. Upon arrival at the safe sites, a complete head count will be given to Project Manager and individuals will stay at the safe site until the area is secured.

D. Personal Injury

If an injury occurs due to an accident or exposure to a hazardous substance, the CWM-ENRAC CP will be immediately notified by radio. The Site Safety Officer will be given all appropriate information concerning the nature and cause of the injury so that treatment preparations can be initiated. The injured person will be transported to the hot line where appropriate first aid and treatment can begin. The Project Manager will be informed and will investigate the cause of the injury and make any necessary changes in work procedures.

E. Ambient Monitoring Contingencies

When ambient monitoring on the downwind edge of the site indicates higher than background levels of any contaminant, the Safety Officer and Project Manager will immediately determine the cause, make changes to work practices or procedures, and if necessary, make changes in site layout (i.e., change the location of the CP, decon area, or Exclusion Area), warn unprotected personnel to evacuate or don protective equipment, coordinate with local authorities to effect off-site evacuation.

IX. RECORDKEEPING

A. General - Recordkeeping shall be consistent with OSHA regulations in all respects. The following permanent records will be maintained in both the regional ENRAC Health and Safety Office and at the site:

1. Safety Inspection Reports
2. Personnel Exposure Monitoring Records (spiral or bound permanent log books will be used)
3. OSHA 200 - Current to within 5 days
4. Accident reports consistent with the established CWM-ENRAC procedures.

B. Medical Records

Permanent medical records shall be maintained in confidential files by the regional contract physician and by the ENRAC Corporate Health and Safety Manager.

Exhibit A

INORGANIC ARSENIC

EMPLOYEE INFORMATION MANUAL

ENRAC

H & S DEPT. - 2/84

EA0573

WHAT IS INORGANIC ARSENIC ?

GRAY METAL

INSOLUBLE IN WATER

LOW LEVELS FOUND OFTEN IN NATURE

EXTRACTED FROM METAL ORES

MANY INDUSTRIAL USES

- INSECTICIDES
- FUNGICIDES
- WOOD PRESERVATIVES
- BRONZING AGENTS

WHO IS EXPOSED AND HOW ?

OCCUPATIONAL EXPOSURES

PESTICIDE FORMULATION

BRASS AND BRONZE SMELTING

INDUSTRIAL CERAMICS

NON OCCUPATIONAL EXPOSURES

GARDENING

WINE MAKING

WOOD PRESERVING

SEAFOOD CONSUMPTION

WHERE COULD YOU BE EXPOSED TO ARSENIC ?

POSSIBLE ENRAC WORK EXPOSURES

SOIL EXCAVATION

PESTICIDE PLANTS

PAINT STORAGE AND MIXING VESSELS

WHAT ARE THE HEALTH EFFECTS ?

SYMPTOMS OF ACUTE EXPOSURE

HEADACHE

SORE THROAT

SKIN RASHES

CHEST PAIN

VOMITING

DIARRHEA

STOMACH CRAMPS

SYMPTOMS OF CHRONIC EXPOSURE

CHRONIC NAUSEA

SKIN LESIONS

WEIGHT LOSS

BRONCHITIS

PERFORATION OF THE NASAL SEPTUM

SKIN CANCER

LUNG CANCER

ROUTES OF ENTRY

INHALATION

CAUSE

IMPROPER RESPIRATOR USE

UNKNOWN EXPOSURES

POOR WORK PRACTICES

SKIN ABSORPTION

NOT USING PROTECTIVE CLOTHING

IMPROPER DECON. PROCEDURES

POOR WORK PRACTICES

INGESTION

POOR WORK HABITS

POOR PERSONAL HYGIENE

FOOD AND DRINKS IN WORK AREA

EA0578

OSHA REGULATIONS

FED OSHA 1910.1018

STATE OSHA REGULATIONS

ENRAC PROCEDURE 0541

PERMISSIBLE EXPOSURE LIMIT (PEL)

NO EMPLOYEE SHALL BE EXPOSED TO AIRBORNE INORGANIC ARSENIC CONCENTRATIONS GREATER THAN 10 micrograms per cubic meter of air

8 HOUR TIME WEIGHTED AVERAGE

CONTROL MEASURES

- CAREFULLY FOLLOW ALL ARSENIC WORK PROCEDURES
- WEAR PROTECTIVE WORK CLOTHING WITH HOOD
- WEAR AN APPROVED RESPIRATOR DURING ALL EXPOSURES
- THOROUGHLY CLEAN CLOTHING AND SHOES BEFORE REMOVING
- SHOWER AND SHAMPOO BEFORE LEAVING WORK

EXHIBIT A

RESPIRATORY PROTECTION FOR INORGANIC ARSENIC

CONCENTRATIONS OF AIRBORNE INORGANIC ARSENIC OR CONDITION OF USE	RESPIRATOR TYPE[1]
1. Not greater than 0.1 milligrams (of compounds with no significant vapor pressure) per cubic meter	1. Air-purifying, with high efficiency particulate filter and half-mask;[2,3] Any supplied air respirator with half-mask.[2]
2. Not greater than 0.1 milligrams of arsenic trichloride (and all compounds with significant vapor pressure) per cubic meter	2. See respirator type required under 4.
3. Not greater than 0.5 milligrams (of compounds with no significant vapor pressure) per cubic meter	3. Air-purifying with high efficiency particulate filter[3] and full facepiece; Any supplied air respirator with full facepiece; Any self-contained breathing apparatus with full facepiece.
4. Not greater than 0.5 milligrams of arsenic trichloride (and compounds with significant vapor pressure) per cubic meter	4. Gas mask, front or back mounted, equipped with high efficiency filter[3], acid gas canister, and full facepiece; Any supplied air respirator with full facepiece; Any self-contained breathing apparatus with full facepiece.
5. Not greater than 10 milligrams (of compounds with no significant vapor pressure) per cubic meter	5. Powered air-purifying with high efficiency particulate filter [3] and half-mask[2], full facepiece, hood or helmet; Supplied air, operated in positive pressure mode, with half-mask[2].
6. Not greater than 10 milligrams of arsenic trichloride (and all compounds with significant vapor pressure) per cubic meter	6. See respirator type required under 7.

EXHIBIT A

RESPIRATORY PROTECTION FOR INORGANIC ARSENIC (CONT'D)

CONCENTRATION OF AIRBORNE INORGANIC ARSENIC OR CONDITION OF USE	RESPIRATOR TYPE[1]
7. Not greater than 20 milligrams per cubic meter	7. Supplied-air, operated in positive pressure mode, with full facepiece, hood, helmet suit.
8. Firefighting and/or any unknown or known concentration	8. Self-contained breathing apparatus with full facepiece operated in pressure-demand mode; Combination breathing apparatus supplied-air, positive pressure full facepiece respirator with auxiliary self-contained compressed air supply.

1 Respirators specified for high concentrations can be used at lower concentrations of arsenic.

2 Full facepiece is required if the arsenic compound causes eye or skin irritation at the use concentrations.

3 A high efficiency particulate filter means 99.97 percent efficient against 0.3 micrometer monodisperse diethylhexyl phthalate (DOP) particles.

ENRAC Division	PROCEDURE NUMBER 0541	PAGE 1 OF 7
SAFETY PROCEDURE	EFFECTIVE DATE February 15, 1984	SUPERSEDES
SUBJECT: Inorganic Arsenic Control Measures	APPROVED: J. Robert Steele	

I. PURPOSE

To prescribe the health and safety procedures, respiratory protective devices and personal protective apparel required for the safe handling of inorganic arsenic and inorganic arsenic compounds.

II. SCOPE

This directive applies to all ENRAC operations which process, handle, transport or dispose of inorganic arsenic and inorganic arsenic compounds.

III. REFERENCES

A. Title 29, Code of Federal Regulations, Section 1910.1018.

B. Title 8, California Administrative Code, Section 5214.

C. HESIS Medical Guideline for Arsenic; California Department of Health Services, March, 1983.

D. NIOSH; A Guide to the Work-Relatedness of Disease; DHEW No. 79-116, January, 1979, pp. 40-53.

E. NIOSH; Criteria for a Recommended Standard: Occupational Exposure to Inorganic Arsenic; DHEW No. 75-149, 1975.

IV. DISCUSSION

Arsenic can be found in small amounts in soil and water throughout the world. For commercial and industrial uses, it is removed as a byproduct from the treatment of copper, tin, zinc and lead ores, usually as arsenic trioxide. Arsenic forms numerous compounds and these are used industrially as insecticides, fungicides, wood preservatives and as bronzing agents in glass manufacturing.

Although arsenic is not an essential element of human metabolism, it is, owing to its wide distribution in nature, constantly taken into the human body in small quantities. Nonoccupational exposures to arsenic have resulted in elevated urinary levels, with the highest reported levels being attributed to probable seafood consumption.

Arsenic is an irritant to the skin and mucous membranes and can cause both acute and chronic poisoning. Epidemiologic data show a relationship between occupational exposure to arsenic and the development of cancer of the lung, lymphatic system and the skin.

Due to these extreme health hazards, occupational exposures to arsenic and its compounds are strictly regulated by Fed-OSHA (29 CFR 1910.1018) and State OSHA Programs (e.g. CAL/OSHA 8 CAC 5214). This directive is intended to provide procedural guidelines for compliance with the OSHA regulations.

V. PROCEDURE

A. Employee Training and Information

1. All employees who are subject to arsenic exposures shall complete a formal arsenic training program prior to their assignment to arsenic operations. This training shall be repeated annually. The training shall include, as a minimum, the following information:

   a. The specific nature of the operations which could result in exposure to arsenic.

   b. The purpose, proper selection, fitting, use and limitations of personal protective equipment required for arsenic work.

   c. The employer's responsibilities and workers rights prescribed in the OSHA arsenic regulations.

   d. A description of the industrial hygiene monitoring program and the purpose of the medical surveillance program for arsenic workers.

   e. The safe work practices and engineering control measures required for the control of arsenic exposure.

2. A properly completed Material Safety Data Sheet for each specific arsenic compound, prepared in accordance with established ENRAC procedures, shall be available at each arsenic job site for employee review.

B. Medical Surveillance

1. General

   All employees shall complete a pre-hire or periodic/update medical examination prior to their assignment to arsenic operations. This examination shall include at least the following:

a. A work history and a medical history which shall include a smoking history and the presence and degree of respiratory symptoms such as breathlessness, cough, sputum production and wheezing.

b. A physical examination which includes at least:

1) a 14" x 17" posterior-anterior chest x-ray and ILO u/c rating;

2) a nasal and skin examination;

3) a sputum cytology examination; and

4) other tests deemed appropriate by the examining physician and/or ENRAC Medical Consultant because of the employee's previous chemical exposure. This may include, but is not limited to, the following:

a) electrocardiogram;
b) liver function studies;
c) complete blood cell count; and
d) pulmonary function testing.

2. Periodic Examinations

The complete medical examination described in Section 1, above, shall be repeated annually for all arsenic workers.

C. Permissible Exposure Limits

1. The 8 hour time-weighted average concentration of airborne arsenic to which any employee may be exposed without respiratory protection shall not exceed 10 micrograms per cubic meter of air, as determined by accepted industrial hygiene sampling and analytical techniques.

2. Careful consideration must be given to the additional contribution to the overall exposure level by skin absorption and ingestion of arsenic due to poor work practices and personal hygiene.

D. Personal Protective Equipment

1. General

The selection, use and maintenence of personal protective equipment for arsenic operations shall comply in all respects to established CWM-ENRAC policies and procedures and OSHA regulations. Selection of respiratory protection for arsenic work must be reviewed by the ENRAC Health and Safety Department.

2. Respiratory Protective Equipment

a. Respiratory Protection as specified in Exhibit A shall be provided and used, based on airborne arsenic concentrations.

b. Only properly cleaned, maintained NIOSH/MSHA approved respirators shall be used.

c. Only employees who are medically qualified to wear respiratory protective devices shall be assigned to arsenic operations.

d. Employees shall be permitted to leave work areas to wash their faces and respirator facepiece as necessary to prevent skin irritation associated with respirator use.

e. When air-purifying respirators are used, employees shall be required to change filter elements at the end of each shift. Filter elements shall also be changed whenever an increase in breathing resistance is detected.

3. Protective Clothing

In any operation where employees may be exposed to arsenic concentrations above the permissible exposure limit, without regard to the use of respirators, the following protective equipment shall be provided:

a. Full body disposable coveralls with hoods or similar full-body clothing (washable and reuseable garments shall be thoroughly cleaned before reissue).

b. Disposable work gloves appropriate for work.

c. Rubber, plastic or neoprene work boots with steel toe and shank, and seamless construction.

d. Face shields, goggles or other appropriate eye protection.

e. Other appropriate safety equipment, such as hearing protection, fall protection, etc. that the work requires.

E. Regulated Work Areas

1. Access to arsenic-contaminated work areas shall be controlled and limited to properly equipped, authorized personnel.

2. Arsenic work areas shall be clearly delineated with physical barriers, barricade tape or other effective means to prevent unauthorized entry.

3. All entrances or approaches to the regulated work area shall be posted with warning signs bearing the following legend:

DANGER

(Insert applicable chemical name)

CANCER HAZARD

AUTHORIZED PERSONNEL ONLY

NO SMOKING OR EATING

RESPIRATOR REQUIRED

F. General Safe Work Practices

1. Whenever possible, wet methods shall be used when handling or processing arsenic compounds. Water spray, fogging or water collection systems, etc., shall be used.

2. Floors and other accessible surfaces contaminated with inorganic arsenic shall not be cleaned by the use of compressed air, and shoveling and brushing may be used only where vacuuming or other relevant methods have been tried and found not to be effective.

3. The cleaning of floors or other surfaces contaminated with inorganic arsenic particulate by washing down with a hose is prohibited unless a fine spray has first been laid down.

4. Any spill of arsenic shall be cleaned up promptly. Arsenic shall not be allowed to accumulate in the work areas at any time.

5. Employees shall not be permitted to exit a regulated work area until contaminated equipment and clothing has been removed and decontaminated or properly disposed.

6. Removal of arsenic from protective clothing or equipment by mechanical shaking, blowing or other means which disperses arsenic into the air is prohibited.

7. Any work in confined spaces or other similar hazardous locations shall be subject to the provisions of established CMI-ENRAC policies and procedures.

8. Where cleaning is performed with a portable vacuum cleaner, the device shall be equipped with a high efficiency particulate filter (HEPA) approved for arsenic use.

9. No food, beverages or tobacco products shall be present or used in the regulated area.

10. Caution labels shall be affixed to all raw materials, mixtures, scrap, waste and debris containing arsenic. Caution labels shall be conspicuous and legible and shall bear the following legend:

DANGER

CONTAINS INORGANIC ARSENIC

CANCER HAZARD

HARMFUL IF INHALED OR SWALLOWED

USE ONLY WITH ADEQUATE VENTILATION

OR RESPIRATORY PROTECTION

G. Personal Hygiene and Decontamination Procedures

1. Change rooms with shower facilities shall be provided for the use of employees working in arsenic regulated areas. These facilities must provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes. All employees shall be required to shower, including thorough washing of the hair, at the end of each shift.

2. During cleaning operations, all workers shall be required to exit the regulated area(s) and wash their hands and faces prior to eating, drinking or smoking.

3. Contaminated clothing and equipment shall be placed in sealed impermeable bags or other closed impermeable containers, and labeled in accordance with section F-10.

H. Monitoring and Recordkeeping

1. Air monitoring for arsenic operations shall be performed to determine the concentration of arsenic within the breathing zone of employees whose exposure to airborne arsenic may exceed an 8-hour time-weighted average concentration of 10 micrograms per cubic meter of air.

2. Air monitoring and sample analyses shall be performed in accordance with established industrial hygiene and NIOSH procedures and shall be consistent with the provisions of the OSHA regulations.

3. Air sampling results shall be maintained regionally in individual personnel files and other permanent records in accordance with established CWM-ENRAC policies and procedures.

I. Agency Notification

Some regulatory agencies, such as state OSHA and air quality management districts, etc., require prior notification (in some cases, 10 or more calendar days) before starting arsenic operations. Contact the regional Health and Safety Representative for assistance.

EXHIBIT A

RESPIRATORY PROTECTION FOR INORGANIC ARSENIC

CONCENTRATION OF AIRBORNE INORGANIC ARSENIC OR CONDITION OF USE	RESPIRATOR TYPE[1]
1. Not greater than 0.1 milligrams (of compounds with no significant vapor pressure) per cubic meter	1. Air-purifying, with high efficiency particulate filter and half-mask; [2,3] Any supplied air respirator with half-mask. [2]
2. Not greater than 0.1 milligrams of arsenic trichloride (and all compounds with significant vapor pressure) per cubic meter	2. See respirator type required under 4.
3. Not greater than 0.5 milligrams (of compounds with no significant vapor pressure) per cubic meter	3. Air-purifying with high efficiency particulate filter[3] and full facepiece; Any supplied air respirator with full facepiece; Any self-contained breathing apparatus with full facepiece.
4. Not greater than 0.5 milligrams of arsenic trichloride (and compounds with significant vapor pressure) per cubic meter	4. Gas mask, front or back mounted, equipped with high efficiency filter[3], acid gas canister, and full facepiece; Any supplied air respirator with full facepiece; Any self-contained breathing apparatus with full facepiece.
5. Not greater than 10 milligrams (of compounds with no significant vapor pressure) per cubic meter	5. Powered air-purifying with high efficiency particulate filter [3] and half-mask[2], full facepiece, hood or helmet; Supplied air, operated in positive pressure mode, with half-mask[2].
6. Not greater than 10 milligrams of arsenic trichloride (and all compounds with significant vapor pressure) per cubic meter	6. See respirator type required under 7.

EXHIBIT A

RESPIRATORY PROTECTION FOR INORGANIC ARSENIC (CONT'D)

CONCENTRATION OF AIRBORNE INORGANIC ARSENIC OR CONDITION OF USE	RESPIRATOR TYPE[1]
7. Not greater than 20 milligrams per cubic meter	7. Supplied-air, operated in positive pressure mode, with full facepiece, hood, helmet suit.
8. Firefighting and/or any unknown or known concentration	8. Self-contained breathing apparatus with full facepiece operated in pressure-demand mode; Combination breathing apparatus supplied-air, positive pressure full facepiece respirator with auxiliary self-contained compressed air supply.

1 Respirators specified for high concentrations can be used at lower concentrations of arsenic.

2 Full facepiece is required if the arsenic compound causes eye or skin irritation at the use concentrations.

3 A high efficiency particulate filter means 99.97 percent efficient against 0.3 micrometer monodisperse diethylhexyl phthalate (DOP) particles.

INORGANIC ARSENIC

EMPLOYEE TRAINING RECORD

EMPLOYEE NAME:_____ JOB TITLE:_____
(Please Print)

DIVISION:_____ LOCATION:_____

DATE OF TRAINING:_____

READ CAREFULLY AND INITIAL BLOCK

	INITIALS
1. I have been informed about the potential health hazards associated with exposure to this material.	
2. I have received copies of the applicable OSHA regulations and company procedures governing the use of this material.	
3. I have been informed about the types of work that might result in exposure to this material and I have been instructed about the protective measures required to prevent exposure, including measures for emergency conditions.	
4. I have been informed about the monitoring and medical surveillance programs applicable to employee exposure to this material.	

EMPLOYEE SIGNATURE_____

DATE_____

EA0592

ENRAC Division SAFETY PROCEDURE	PROCEDURE NUMBER 0542	PAGE 1 OF 7
	EFFECTIVE DATE February 20, 1984	SUPERSEDES
SUBJECT Inorganic Lead Control Measures	APPROVED J. Robert Steele	

I. PURPOSE

To prescribe the health and safety procedures, respiratory protective devices and personal protective apparel required for the safe handling of inorganic lead and inorganic lead compounds.

II. SCOPE

This directive applies to all ENRAC operations which process, handle, transport or dispose of inorganic lead and inorganic lead compounds.

Exception: This directive does not apply to operations which handle organic lead compounds such as tetraethyl and tetramethyl lead.

III. REFERENCES

A. Title 29, Code of Federal Regulations, Section 1910.1025.

B. Title 8, California Administrative Code Section 5216.

C. HESIS Medical Guideline for Lead; California Department of Health Services, March, 1983.

D. NIOSH; A Guide to the Work-Relatedness of Disease; DHEW No. 79-116, January, 1979, pp. 99-116.

E. NIOSH; Criteria for a Recommended Standard: Occupational Exposure to Inorganic Lead; DHEW No. 78-158, 1978.

IV. DISCUSSION

Lead, a soft, blue-gray metal, occurs naturally in underground deposits. It is mined for its many industrial uses, and has become one of the most common contaminants in the environment.

Occupational exposures to lead fume and dust are the most common sources of poisoning, usually from smelting, battery manufacturing and demolition operations. In industrial use, the highly soluble lead compounds, such as the acetate, chloride and oxide, are more hazardous than the less soluble compounds (e.g., chromate, sulfide). Acute toxic effects of lead are greatly influenced by dietary levels of calcium, iron, fats and proteins. Most poisonings occur as a

result of repeated exposures over a period of weeks, months or even years. The effects of lead poisoning are cumulative and result in a wide variety of health problems beginning with nonspecific symptoms such as fatigue, dizziness, cramps and headaches and eventually leading to disorders that can end in paralysis, brain damage and death.

Occupational exposures to inorganic lead and its compounds are strictly regulated by Fed-OSHA (29 CFR 1910.1025) and State OSHA programs (e.g., CAL/OSHA 8 CAC 5216). This directive is intended to provide procedural guidelines to prevent employee exposures to lead and to ensure compliance with the OSHA regulations.

V. PROCEDURE

A. Employee Training and Information

1. All employees who are subject to lead exposures shall complete a formal training program prior to their assignment to lead operations. This training shall be repeated annually. The training shall include, as a minimum, the following information:

   a. The specific nature of the operations which could result in exposure to lead.

   b. The purpose, proper selection, fitting, use and limitations of personal protective equipment required for lead work.

   c. The employer's responsibilities and workers rights prescribed in the OSHA lead regulations.

   d. A description of the industrial hygiene monitoring program and the purpose of the medical surveillance program for lead workers.

   e. The safe work practices and engineering control measures required for the control of lead exposure.

2. A properly completed Material Safety Data Sheet for each specific lead compound, prepared in accordance with established ENRAC procedures, shall be available at each lead job site for employee review.

B. Medical Surveillance

1. General

   All employees shall complete a pre-hire or periodic/update medical examination prior to their initial assignment to lead operations. This examination shall include at least the following:

a. a detailed work history and a medical history, with particular attention to past lead exposure (occupational and non-occupational), personal habits (smoking, hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and neurological problems;

b. a thorough physical examination, with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular and neurological systems;

c. pulmonary function testing;

d. A blood sample and analysis which determines:

1) blood lead level;

2) hemoglobin and hematocrit determinations, red cell indices and examination of peripheral smear morphology;

3) zinc protoporphyrin;

4) blood urea nitrogen; and

5) serum creatinine

e. urinalysis with microscopic examination; and

f. any laboratory or other test deemed appropriate by the examining physician and/or ENRAC Medical Consultant.

2. Periodic Examinations

The complete medical examination described in Section 1, above, shall be repeated annually for all lead workers.

3. Biological Monitoring

Biological monitoring, including blood lead and ZPP level sampling and the medical removal program, consistent with the OSHA requirements, shall continue to be provided to affected employees, in accordance with established CWM-ENRAC policies and procedures.

C. Permissible Exposure Limits

1. The 8 hour time-weighted average concentration of airborne lead to which any employee may be exposed without respiratory protection shall not exceed 50 micrograms per cubic meter of air, as determined by accepted industrial hygiene sampling and analytical techniques.

2. Careful consideration must be given to the additional contribution to the overall exposure level by ingestion of lead due to poor work practices and poor personal hygiene, as well as non-occupational exposures to lead.

D. Personal Protective Equipment

1. General

The selection, use and maintenance of personal protective equipment for lead operations shall comply in all respects to established CWM-ENRAC policies and procedures and OSHA regulations. Selection of respiratory protection for lead work must be reviewed by the ENRAC Health and Safety Department.

2. Respiratory Protective Equipment

a. Respiratory protection as specified in Exhibit A shall be provided and used, based on airborne lead concentrations.

b. Only properly cleaned, maintained NIOSH/MSHA approved respiratory shall be used.

c. Only employees who are medically qualified to wear respiratory protective devices shall be assigned to lead operations.

d. Employees shall be permitted to leave work areas to wash their faces and respirator facepiece as necessary to prevent skin irritation associated with respirator use.

e. When air-purifying respirators are used, employees shall be required to change filter elements at the end of each shift. Filter elements shall also be changed whenever an increase in breathing resistance is detected.

3. Protective Clothing

In any operation where employees may be exposed to lead concentrations above the permissible exposure limit, without regard to the use of respirators, the following protective equipment shall be provided:

a. Full body disposable coveralls with hoods or similar full body clothing (washable and reuseable garments shall be thoroughly cleaned before reissue).

b. Disposable work gloves appropriate for work.

c. Rubber, plastic or neoprene work boots with steel toe and shank, and seamless construction.

d. Face shields, goggles or other appropriate eye protection.

e. Other appropriate safety equipment, such as hearing protection, fall protection, etc. that the work requires.

E. Regulated Work Areas

1. Access to lead-contaminated work areas shall be controlled and limited to properly equipped, authorized personnel.

2. Lead work areas shall be clearly delineated with physical barriers, barricade tape or other effective means to prevent unauthorized entry.

3. All entrances or approaches to the regulated work area shall be posted with warning signs bearing the following legend:

WARNING

LEAD WORK AREA

POISON

NO SMOKING OR EATING

F. General Safe Work Practices

1. Whenever possible, wet methods shall be used when handling or processing lead compounds. Water spray, fogging or water collection systems, etc., shall be used.

2. No food, beverages or tobacco products shall be present or used in the regulated area.

3. Employees shall not be permitted to exit a regulated work area until contaminated equipment and clothing has been removed and decontaminated or properly disposed.

4. Removal of lead from protective clothing or equipment by mechanical shaking, blowing or other means which disperses lead into the air is prohibited.

5. Any work in confined spaces or other similar hazardous locations shall be subject to the provisions of established CWM-ENRAC policies and procedures.

6. Where cleaning is performed with a portable vacuum cleaner, the device shall be equipped with a high efficiency particulate filter (HEPA) approved for lead use.

7. Floors and other accessible surfaces contaminated with inorganic lead shall not be cleaned by the use of compressed air, and shoveling and brushing may be used only where vacuuming or other relevant methods have been tried and found not to be effective.

8. The cleaning of floors or other surfaces contaminated with inorganic lead particulate by washing down with a hose is prohibited unless a fine spray has first been laid down.

9. Any spill of lead shall be cleaned up promptly. Lead shall not be allowed to accumulate in the work areas at any time.

10. Containers of contaminated protective clothing and equipment shall be labelled as follows:

CAUTION

CLOTHING CONTAMINATED WITH LEAD.

DO NOT REMOVE DUST BY BLOWING OR SHAKING.

DISPOSE OF LEAD CONTAMINATED WASH WATER

IN ACCORDANCE WITH APPLICABLE LOCAL, STATE,

OR FEDERAL REGULATIONS.

G. Personal Hygiene and Decontamination Procedures

1. Change rooms with shower facilities shall be provided for the use of employees working in lead regulated areas. These facilities must provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes. All employees shall be required to shower, including thorough washing of the hair, at the end of each shift.

2. During the cleaning operations, all workers shall be required to exit the regulated area(s) and wash their hands and faces prior to eating, drinking or smoking.

3. Contaminated clothing and equipment shall be placed in sealed impermeable bags or other closed impermeable containers, and labeled in accordance with section F-10.

H. Monitoring and Recordkeeping

1. Air monitoring for lead operations shall be performed to determine the concentration of lead within the breathing zone of employees whose exposure to airborne lead may exceed an 8-hour time-weighted average concentration of 50 micrograms per cubic meter of air.

2. Air monitoring and sample analyses shall be performed in accordance with established industrial hygiene and NIOSH procedures and shall be consistent with the provisions of the OSHA regulations.

3. Air sampling results shall be maintained regionally in individual personnel files and other permanent records in accordance with established CWM-ENRAC policies and procedures.

I. Agency Notification

Some regulatory agencies, such as state OSHA and air quality management districts, etc., require prior notification (in some cases, 10 or more calendar days) before starting lead operations. Contact the regional Health and Safety Representative for assistance.

EXHIBIT A

RESPIRATORY PROTECTION
FOR LEAD AEROSOLS

Airborne concentration of lead or condition of use	Required Respirator[1]
Not in excess of 0.5 mg/m^3 (10 x PEL)	Half-mask air purifying respirator equipped with high efficiency filters[2].
Not in excess of 2.5 mg/m^3 (50 x PEL)	Full facepiece, air purifying respirator with high efficiency filters[3].
Not in excess of 50 mg/m^3 (1000 x PEL)	Any powered, air purifying respirator with high efficiency filters[3]; or half-mask supplied air respirator operated in positive pressure mode[2].
Not in excess of 100 mg/m^3 (2000 x PEL)	Supplied-air respirators with full facepiece, hood, helmet or suit, operated in positive pressure mode.
Greater than 100 mg/m^3, unknown concentration, or fire fighting	Full facepiece, self-contained breathing apparatus operated in positive pressure mode.

1. Respirators specified for higher concentrations can be used at lower concentrations of lead.

2. Full facepiece is required if the lead aerosols cause eye or skin irritation at use concentrations.

3. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micrometer monodisperse diethylhexyl phthalate (DOP) particles.

SECTION V TRANSPORTATION

The site mitigation activities to be carried out by ENRAC at the Western Processing facility will require a coordinated effort for transportation services to be provided for this project. The transportation of waste materials from Kent, Washington to the primary hazardous waste disposal facility located in Arlington, Oregon, is critical in that it represents the highest potential, albeit limited, for exposure of waste to the public outside of the immediate vicinity of the Western Processing site. With this in mind, ENRAC has developed a ten point program which will minimize the potential difficulties associated with moving the large volumes of waste materials from the site.

The key elements of ENRAC's transportation program include:

1. Utilization of D.O.T. and EPA licensed and approved vehicles;

2. Training and familiarization with all relevant aspects of the Western Processing transportation activities and requirements;

3. Designation by ENRAC of a Transportation Coordinator (TC) whose responsibility will be to assure that vehicles are scheduled according to the operational requirements of the project. Additionally, ENRAC's TC shall be the primary liaison between the Western Processing site and the disposal facility(ies);

4. Development of an approved routing plan to be strictly adhered to by all transportation vehicles delivering wastes to the permitted disposal facility. Alternate routings shall be provided in the unforeseen event that primary routes are unavailable for travel due to closures, inclement weather conditions, or natural disasters.

The primary routing to be utilized by transportation vehicles hauling wastes from the Western Processing site to the prime disposal facility in Arlington, Oregon will be:

West on 196th Street
South on 181 (W. Valley Ave.)
West on 516
South on I-5
Southeast on I-205
East on I-84
South on 19 (To site)

As an alternative routing, transportation vehicles will be assigned:

West on 196th Street
North on 181 (W. Valley Ave.)
East and North on I-405
East on I-90
South on 97
East on I-84
South on 19 (To site)

5. Stationing of emergency response vehicles at the primary disposal facility in Arlington, Oregon and at the Western Processing site. These vehicles will be staffed by trained emergency response technicians and shall be on call during the waste transportation activities.

6. Scheduling of transportation requirements such that vehicles leaving the Western Processing site will arrive at the disposal facility during daylight hours;

7. Supplying each vehicle hauling waste materials with a specialized spill response kit unique to the load being transported. The kit will enable the trained driver to respond in the unlikely event of an incident while in route.

8. Notification and periodic briefings of the respective State Highway Patrol Departments to the increased level of waste transporting activities during the on-going remedial actions at the Western Processing site;

9. Utilization of weigh scales at the Western Processing site to assure that all loads will be in compliance with State weight limitations. Certified scales are also available at the prime disposal facility in Arlington, Oregon.

10. Inspection of each load prior to departure from the Western Processing site to assure that the necessary shipping documents are complete and accurate, the required lining of the bulk solids trailers is in accordance with specified procedures, and that undercarriage decontamination has been properly performed.

As ENRAC's activities continue at the Western Processing location, ENRAC may add to or modify its transportation program in order to effectively address changing site operational conditions.

Due to the variety of waste materials to be encountered during ENRAC's mitigation efforts at the Western Processing facility, the transportation equipment requirements will vary as well. The majority of wastes to be transported off-site will require the utilization of the following licensed (State & Federal) and certified vehicles:

1. Bulk dump trailers with 20-30 yd^3 capacities for hauling bulk solids, soils, demolition and miscellaneous debris;

2. Flat bed trailers or "flats" that will provide for the movement of drummed materials and miscellaneous containerized debris;

3. Roll-off boxes and trailers with 15-30 yd^3 capacities for transporting demolition and miscellaneous debris;

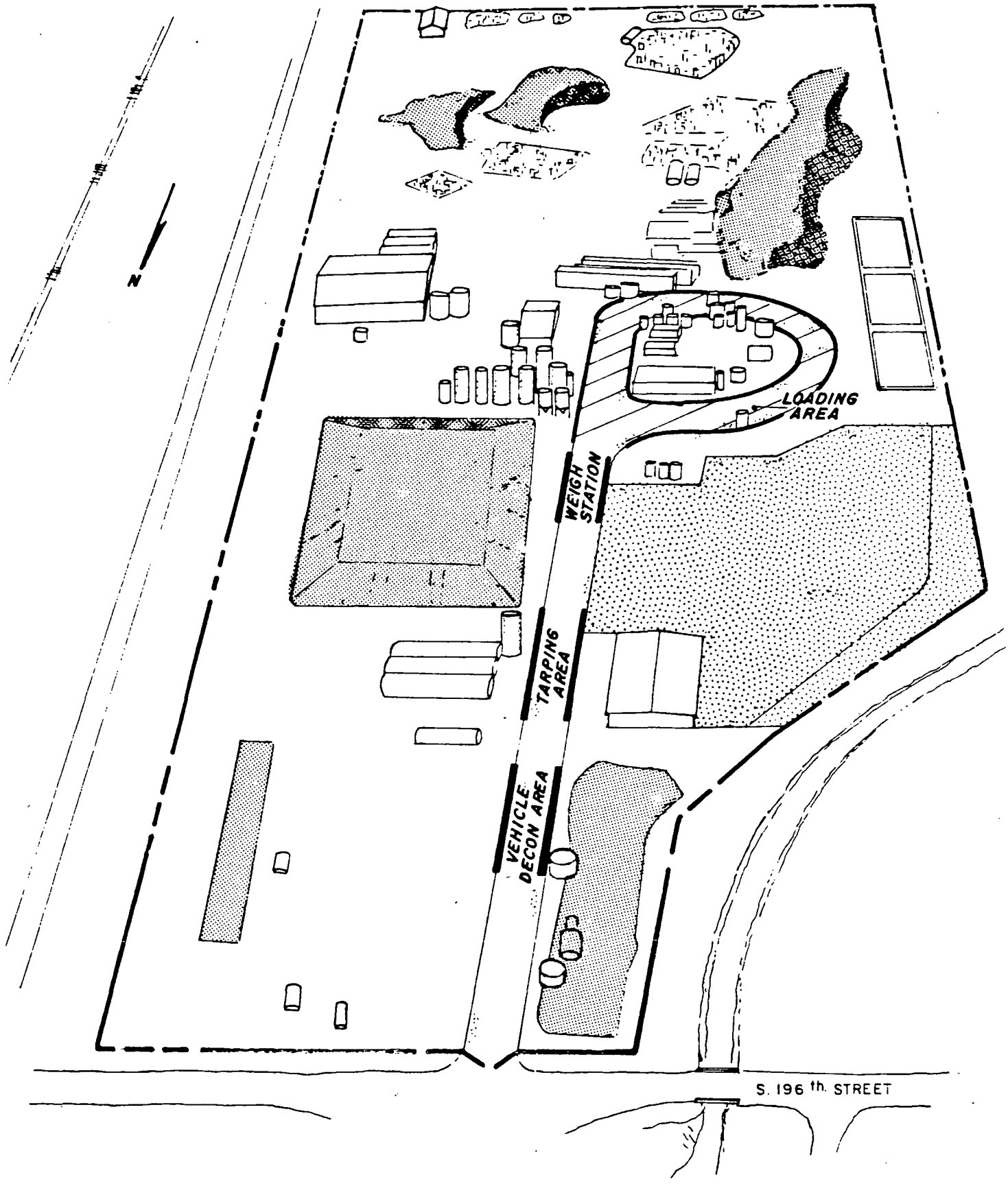
4. Vacuum and/or bulk tankers to be utilized for hauling bulk liquid materials. These vehicles will have vessel volumes ranging from 5,000-7,500 gallons each.

In the event that other specialized transport vehicles are deemed to be appropriate during the transportation phase of this project, ENRAC shall utilize such certified vehicles as a means of providing for an efficient operation.

As detailed in the Operations Section of ENRAC's overall Technical Proposal, bulk dump trailers entering the Western Processing site for receipt of waste materials will proceed according to a specific transportation schedule to coincide with ongoing site operations. This will include initial site check-in for staging assignment and donning of appropriate personal protection. Upon directives received from ENRAC's on-scene Transportation Coordinator, the vehicle will report to a designated area where the trailer will be outfitted with a fitted polyethylene liner by a lining crew at a vehicle tarping station. The lining crew will be essential to the orderly flow of vehicles because of the daily volume of trucks that are necessary to complete the project within the designated time frame. Following lining, the truck will be directed to the appropriate material loading zone. Once loading is accomplished, the vehicle will be weighed at the on-site scale station and then proceed through decontamination procedures and return to the tarping station where ENRAC crews will seal the trailers' polyethylene liner, and secure the trucks' overlying tarp. At completion of these activities, the trailer shall be inspected by the on-scene Transportation Coordinator whereupon the appropriate shipping documents will be provided to the driver and the vehicle will be released for movement to the disposal facility.

For other types of transportation vehicles to be employed for this project, a similar site sequence will be utilized with obvious exceptions; i.e., no tarping of bulk liquid tankers would be required.

As indicated, the mitigation activities to be undertaken by ENRAC at the Western Processing facility will entail a significant volume of vehicle movement between Kent, Washington and the primary disposal facility. ENRAC is confident that through the coordinated Transportation Plan presented herein, coupled with ENRAC's level of experience in managing projects of this magnitude, the overall waste transportation program will effectively respond to the transportation needs of the project and minimize, to the extent possible, the potential for transportation incidents during transit of the waste to the designated disposal facility.



CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

VEHICLE SUPPORT AREAS

(ILLUSTRATIVE)

WESTERN PROCESSING KENT, WA.

DRWG. NO. EN-3

EA0607

SECTION VI TREATMENT/DISPOSAL

The Chemical Waste Management, Inc., Chem Security Systems Hazardous Waste Treatment and Disposal Facility is designated as the primary depository for most Western Processing waste, although CWM-ENRAC may utilize other CWM and CWM approved disposal facilities for certain wastes. On-site synfuels may be used as a secondary fuel for incineration. Any such use of the synfuels will require full approval by both the USEPA and the Generators.

The Chem Security Systems facility is located near Arlington, Oregon, approximately 300 miles from the Western Processing site, and is fully permitted by the State of Oregon, Department of Environmental Quality. The facility presently operates under interim authorization of the United States Environmental Protection Agency and has filed its Part B application, which is presently under review by the USEPA.

An operations plan has been developed for disposal of the waste material from the Western Processing project. This plan includes:

- Additional technical staff to expedite the entry procedures of vehicles;
- Adjustment of site hours to accommodate arriving vehicles.

All disposal operations will be conducted safely and in accordance with all state, federal, and local regulations governing the disposal of hazardous waste. The operations plan will be modified to meet specific project schedule requirements.

After a sample of the individual waste materials from Western Processing has been analyzed by the laboratory at Chem Security, the only analysis that will be required for waste material will be "fingerprint" testing to confirm the characteristics of the waste material against those shown in the complete analysis.

When a truck arrives at the entrance of the Chem Securities facility, the driver will report directly to the on-duty receiving clerk. The receiving

clerk will review the hazardous waste manifest to ensure that it is complete and correct. Should any manifest discrepancies arise, the receiving clerk will be instructed to contact the CWM-ENRAC Western Processing Transportation Coordinator and/or the Project Manager for resolution. All loads will be sampled and will undergo fingerprint testing in accordance with the site Waste Analysis Plan. Samples will be retained until project completion or according to the individual disposal site requirements. In any event, USEPA shall be notified prior to disposal of samples.

After each hazardous waste manifest has been compared with the information shown on the original Waste Profile Sheet, any discrepancies will be noted in the designated space on the manifest. If the analytical characteristics of the load are consistent with the original Waste Profile, the waste information will be logged; the driver will then be permitted to drive the vehicle onto the premises, and will be directed to the staging and tarp removal area. A separate log book will be maintained at the facility for all Western Processing wastes, which will include all dates, loads, sample numbers, manifest numbers, and analytical results.

Technicians will remove and secure the tarp at the staging and tarp removal area to allow discharge of the load. Based upon the air monitoring CWM-ENRAC will perform during excavation at Western Processing, both the technicians and the truck driver will be in an appropriate level of safety protection.

Following removal of the tarp, the driver will be directed to a designated area within the disposal cell. A driver who is unfamiliar with the site will be escorted to the disposal location. Continuous supervision of truck traffic within the Chem Security facility will ensure that trucks are directed to the correct disposal cell.

Upon arrival at the designated disposal area, the load will then be discharged. The waste material will be covered daily with soil to secure it in place and to eliminate emissions. Any residues remaining in or on the vehicle will be removed and covered with soil.

After the load has been completely discharged, the truck will proceed immediately to the vehicle decontamination area within the facility. Vehicles will be inspected, and if required, decontaminated with either a high pressure water wash or other appropriate measures. All water generated from this process will be contained on-site and disposed of as hazardous waste. Vehicle decontamination shall be consistent with the permit requirements of the disposal site.

All disposal operations will be conducted in accordance with the individual disposal site requirements.

CHEM SECURITY SITE SAFETY PLAN

CWM has developed a comprehensive safety plan for all operations at the Chem Security facility. This safety plan covers all activity at the facility including, but not limited to, sampling procedures, on-site transportation, heavy equipment operations, treatment facility operations, and burial cell and shallow surface impoundment operations. The detailed text is available, upon request, for review at the Chem Security facility. The following is a brief outline of the key elements of that plan as it relates to disposal of the Western Processing wastes.

The scope of the Western Processing project will necessitate some minor changes in the standard operating procedures; all specifically implemented operations will strictly adhere to the Chem Security Safety Plan.

All on-site personnel involved in the handling of the material, including truck drivers, as necessary, chemists, and detarpers may be required to wear the following personal protective equipment:

- TYVEK, polyethylene, or rubber rain suits;
- Rubber boots with steel toes;
- Rubber gloves;
- Respirators with appropriate cartridges;
- Hard hats;
- Safety glasses.

All CWM-ENRAC employees that will be involved in the Western Processing unloading and disposal operations will be required to undergo the same pre- and post-job health screening as described in the Western Processing Site Safety Plan.

CWM-ENRAC's policy requires that all on-site employees shower and change to a clean set of clothes prior to leaving the facility after the work day is complete. This eliminates any possibility of long term residual exposure to personnel or of personnel carrying contamination off site.

The aforementioned general and site operating procedures have been referenced to provide for a basic understanding of the disposal site operations. All activities conducted at the disposal site shall be in conformance with established standard operating procedures that are developed in accordance with the site's operating permit as administered by the State of Oregon DEQ.

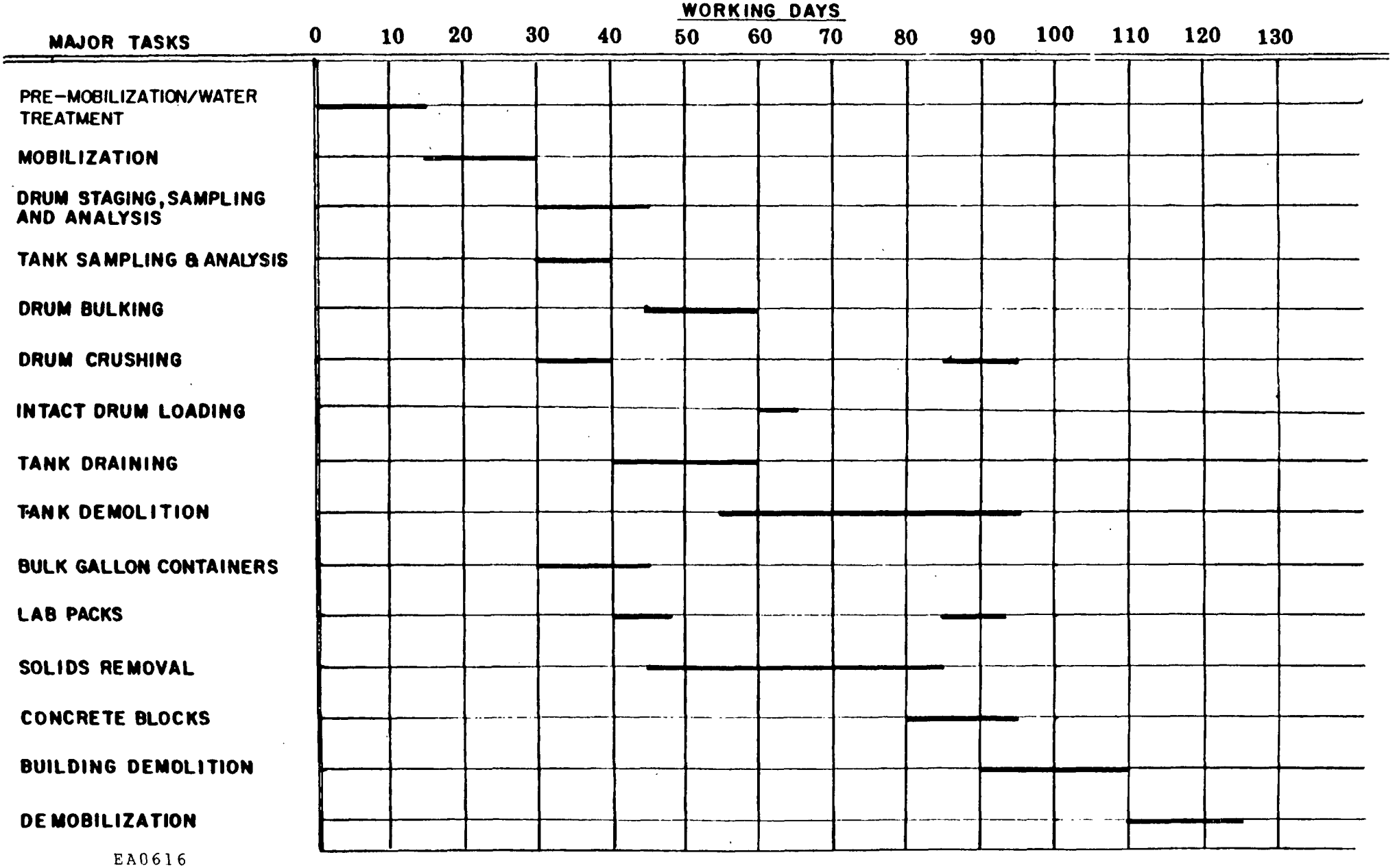
SECTION VII SCHEDULE

The schedule for completion of the entire Scope of Work as detailed in Section II of this proposal is provided on the following chart. Based upon the site specific information available and our past experience involving major site clean-ups, we have developed a workable schedule that allows for project completion within a reasonable time frame. Manpower and equipment requirements have been established which will enable us to perform a variety of tasks concurrently while employing a uniform number of trained personnel throughout the duration of the project. The time frame for this schedule is based upon conducting operations ten hours per day and six days per week. This schedule of work illustrates the expected schedule of completion for the various tasks, but should not be interpreted as binding. CWM-ENRAC may elect to perform the various tasks at different time periods than illustrated and may increase or decrease the actual number of days estimated for each task.

A graphic depiction of CWM-ENRAC's task specific operations are presented on the sequential drawings which follow.

PROJECTED SITE OPERATIONAL SEQUENCE FOLLOWING

COMPLETION OF VARIOUS TASKS

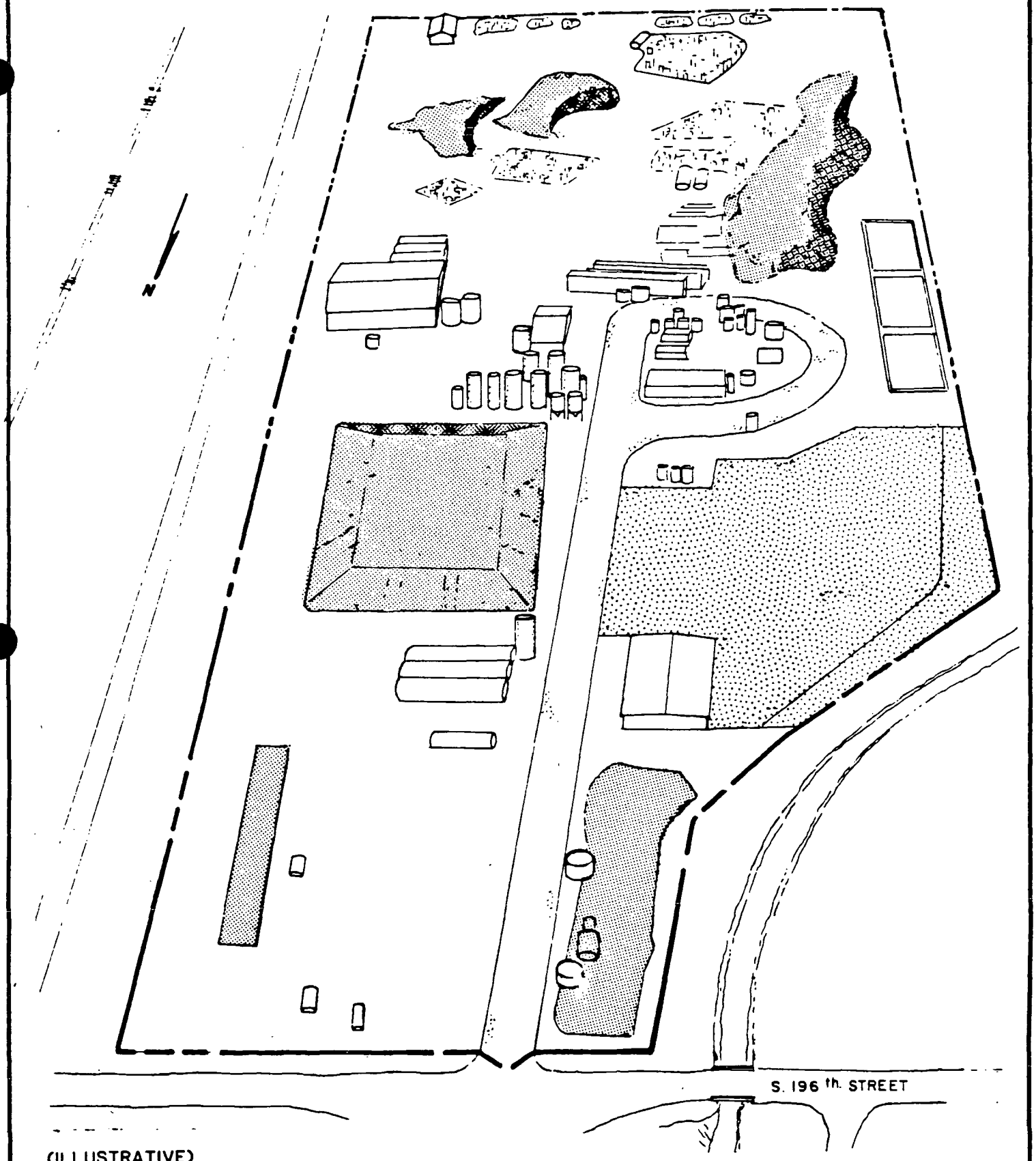


EA0616

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING

REMEDIAL ACTION SCHEDULE



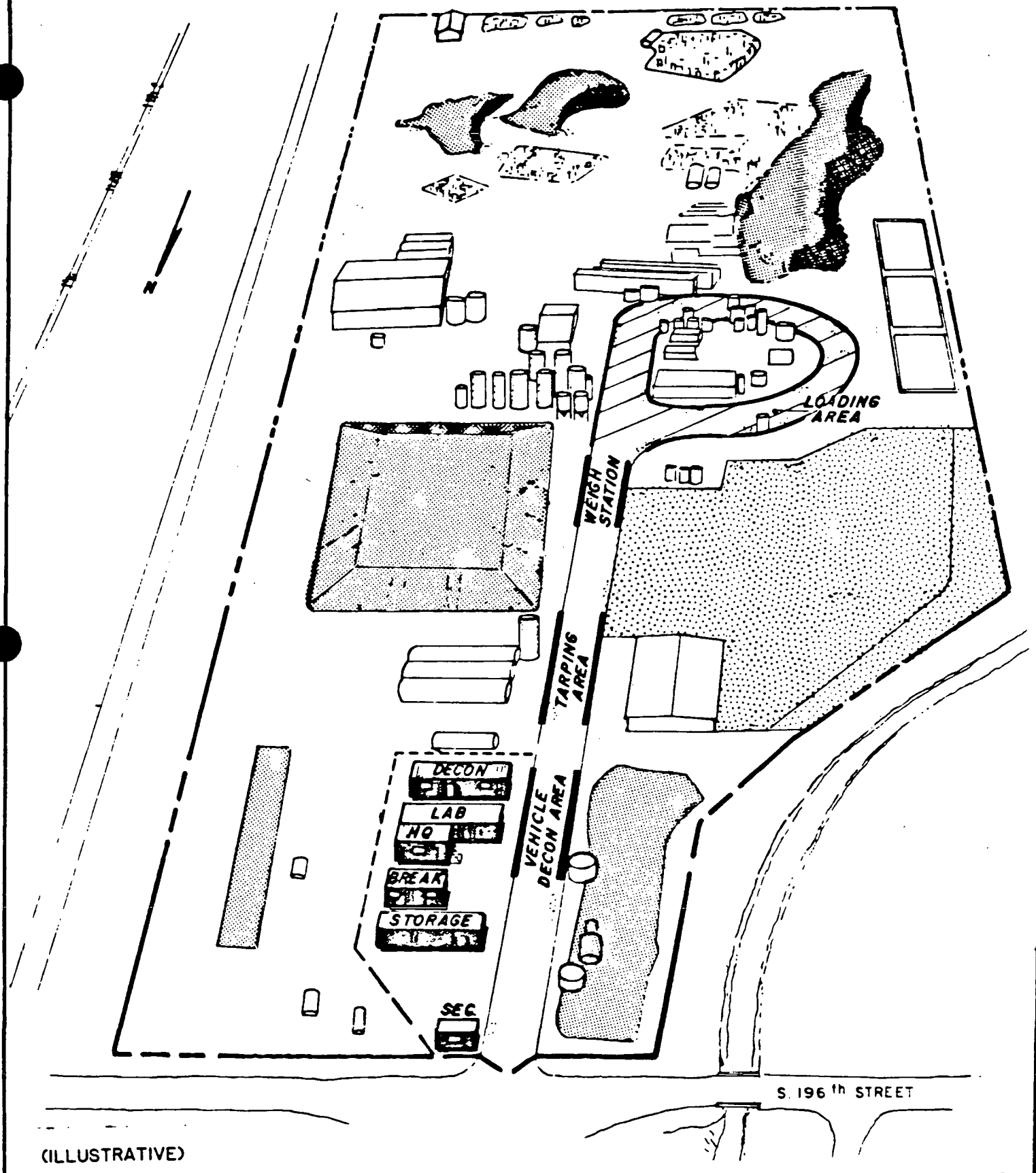
(ILLUSTRATIVE)

PROJECTED SITE CONDITIONS FOLLOWING...
PRE-MOBILIZATION/WATER TREATMENT
EST. TIME : 15 DAYS

EA0617

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.



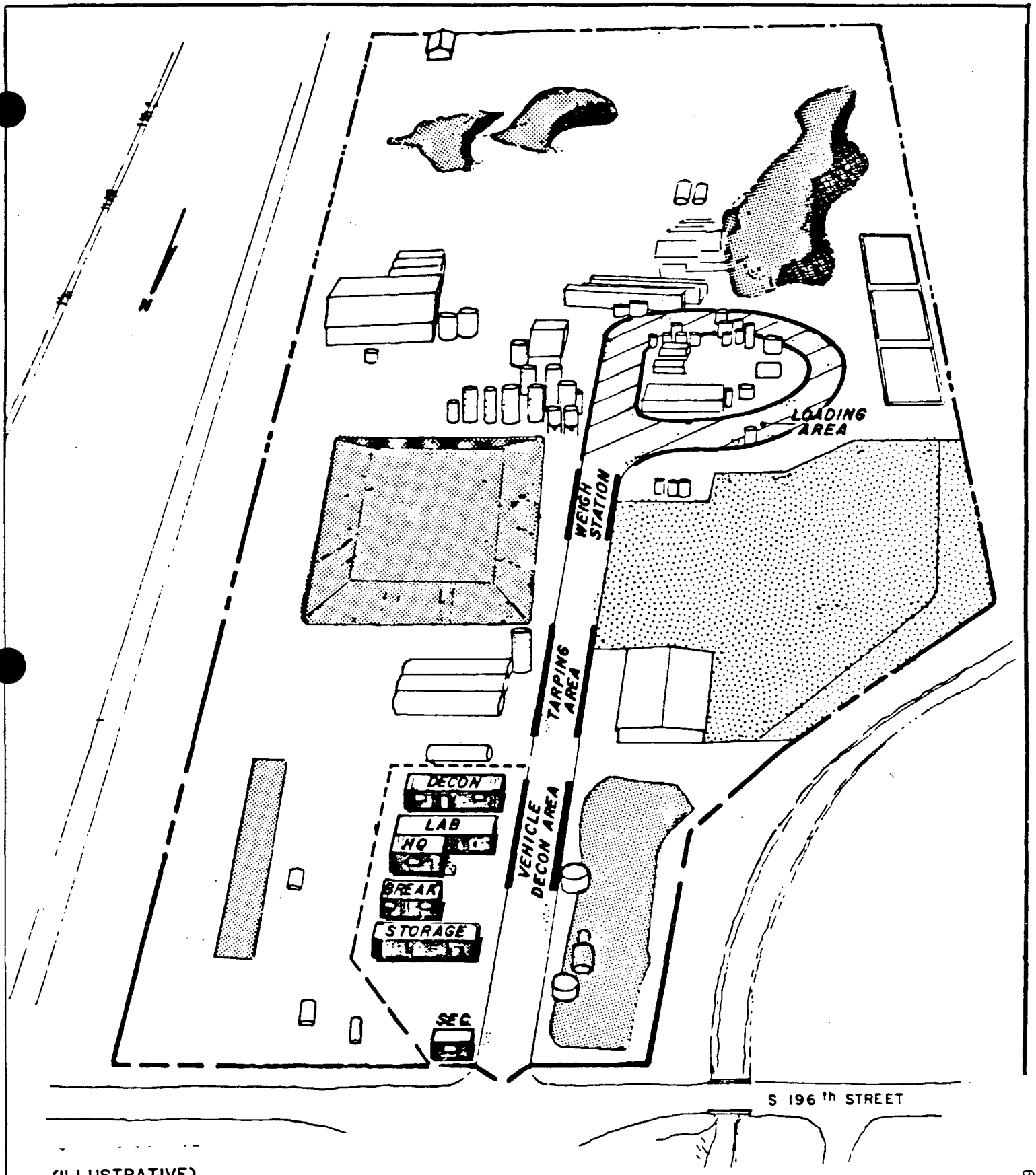
(ILLUSTRATIVE)

PROJECTED SITE CONDITIONS FOLLOWING...
MOBILIZATION
EST. TIME: 15 DAYS

EA0618

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.



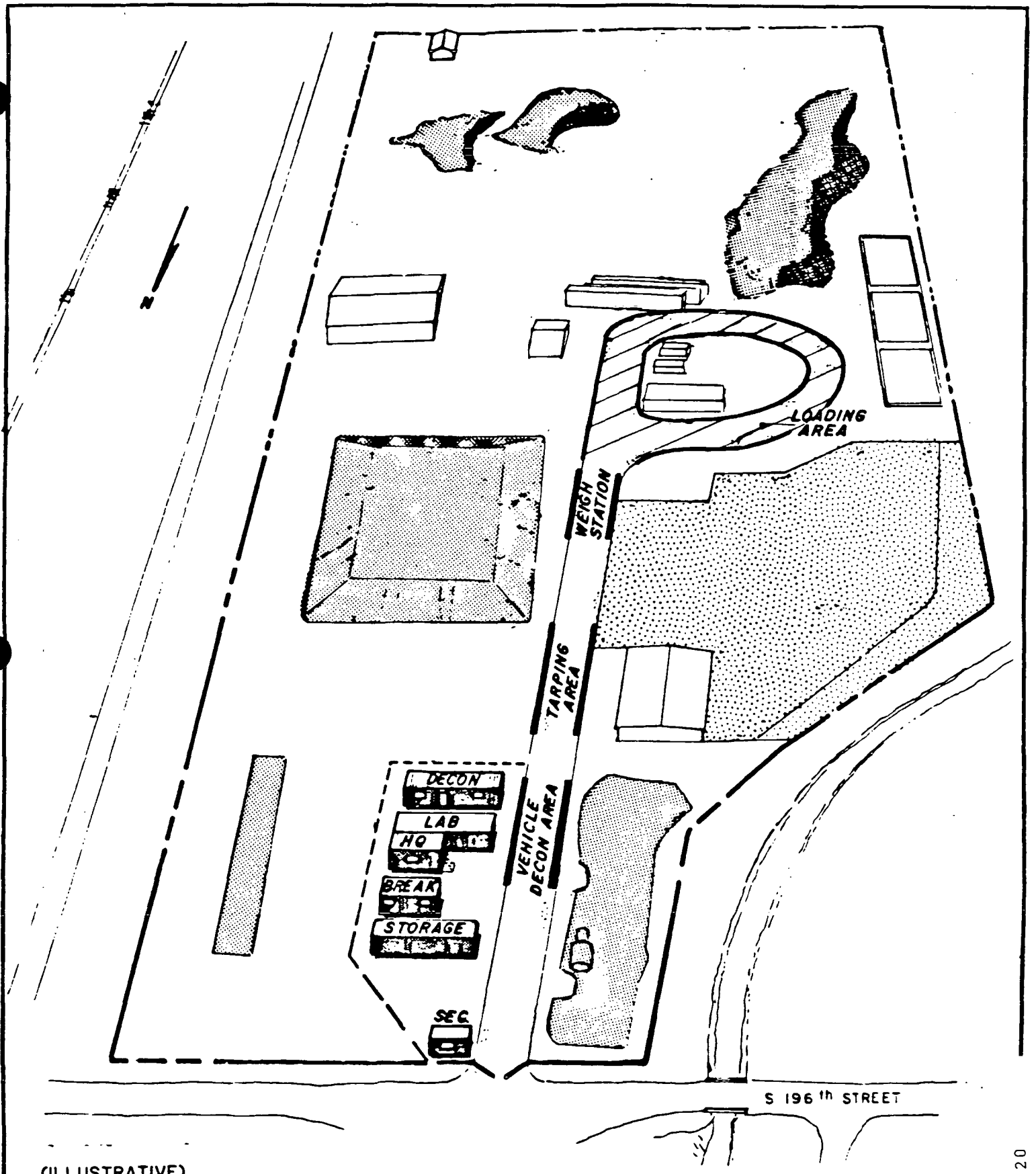
(ILLUSTRATIVE)

PROJECTED SITE CONDITIONS FOLLOWING.
DRUM SAMPLING, LOADING AND
EST. TIME: 30 DAYS CRUSHING

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA

EA0619



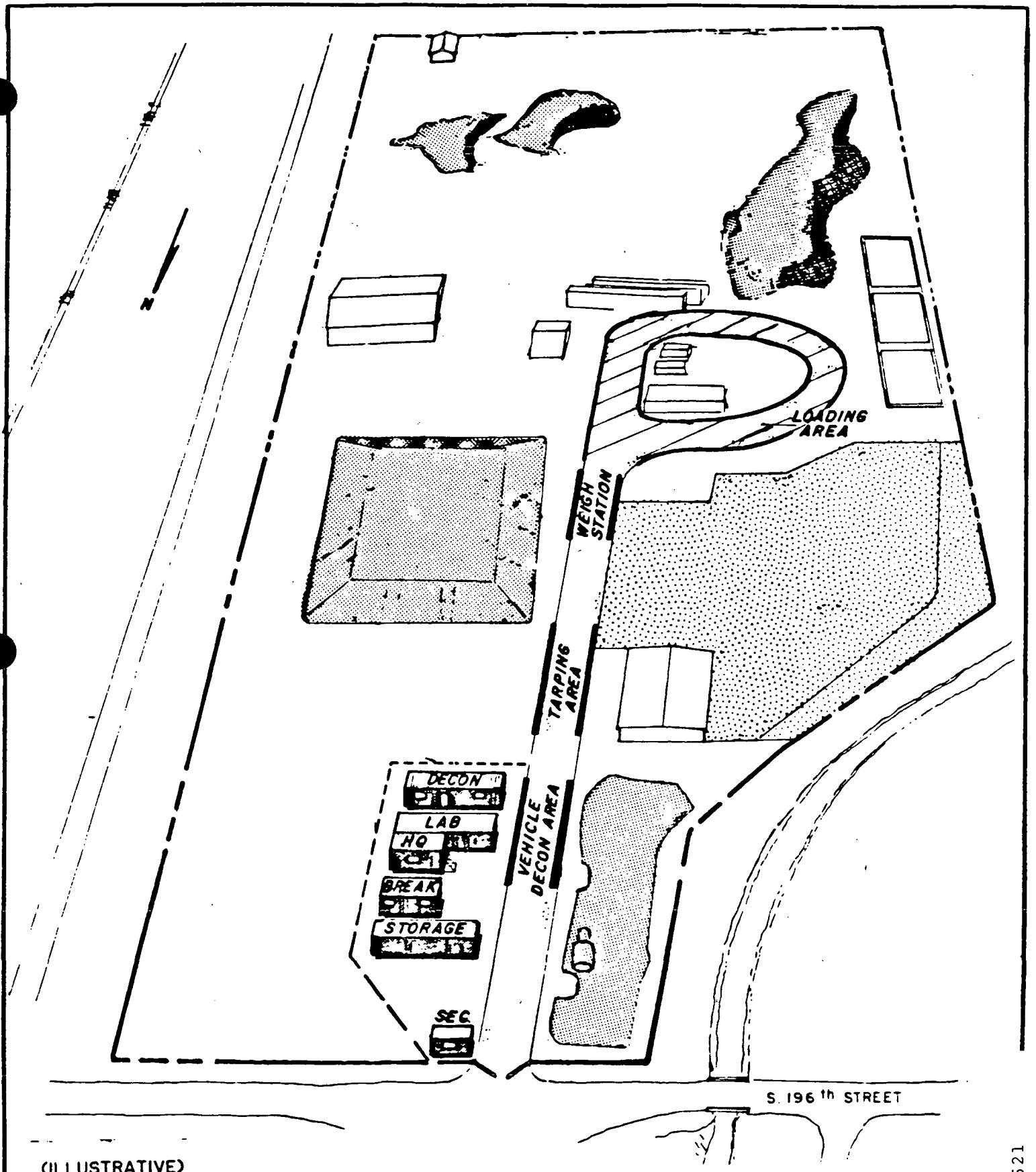
(ILLUSTRATIVE)

PROJECTED SITE CONDITIONS FOLLOWING
TANK ANALYSIS, DRAINING AND
EST. TIME: 70 DAYS DEMOLITION

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.

EA0620



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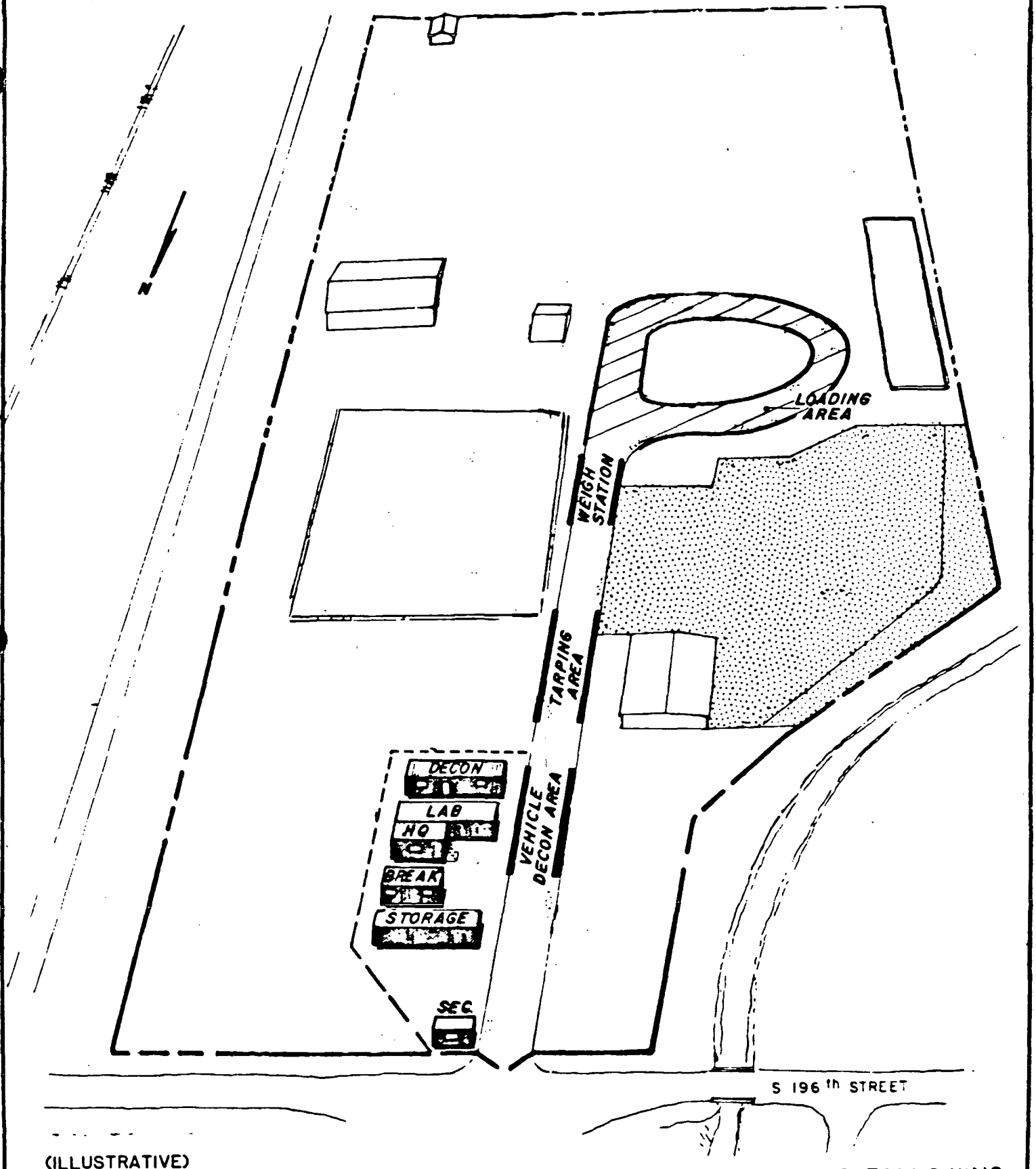
PROJECTED SITE CONDITIONS FOLLOWING
BULK GALLON CONTAINER, AEROSOL CAN &
EST. TIME: 25 DAYS LAB PACK
REMOVAL

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.

EA0621



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PROJECTED SITE CONDITIONS FOLLOWING...

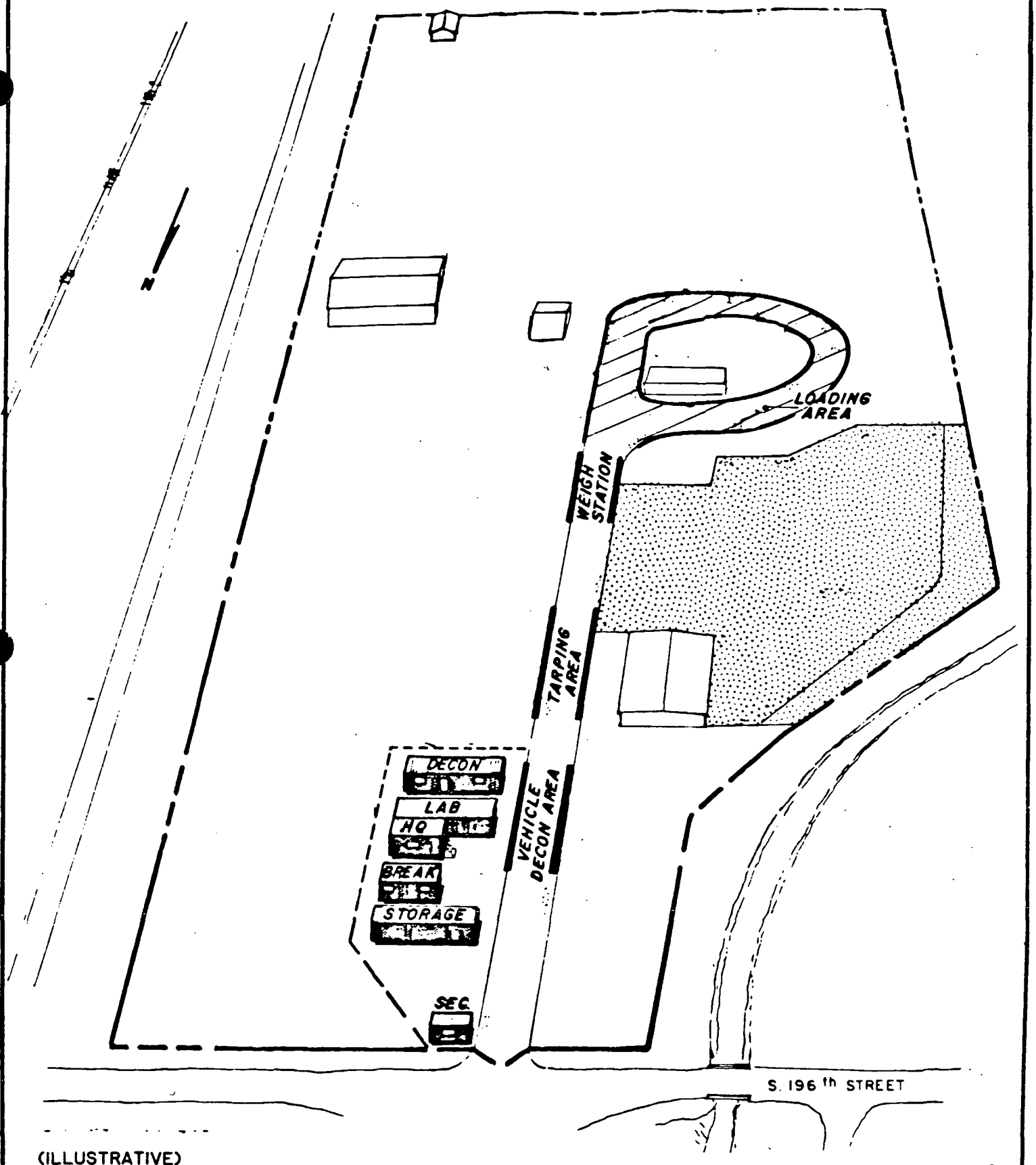
DEBRIS & SOLIDS REMOVAL

EST. TIME : 40 DAYS

EA0622

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.



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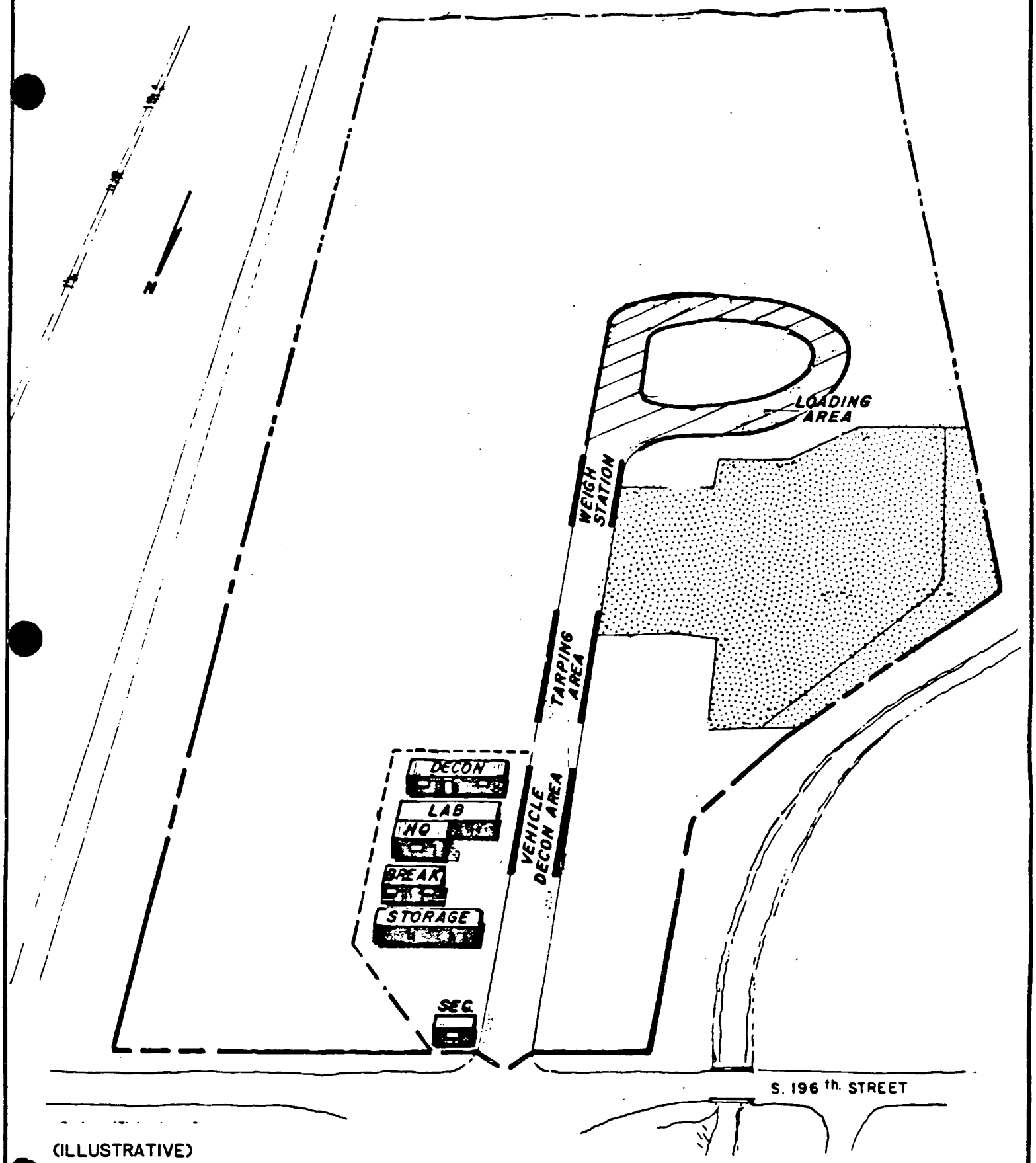
PROJECTED SITE CONDITIONS FOLLOWING...
CONCRETE BLOCK REMOVAL
EST. TIME: 15 DAYS

EA0623

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.



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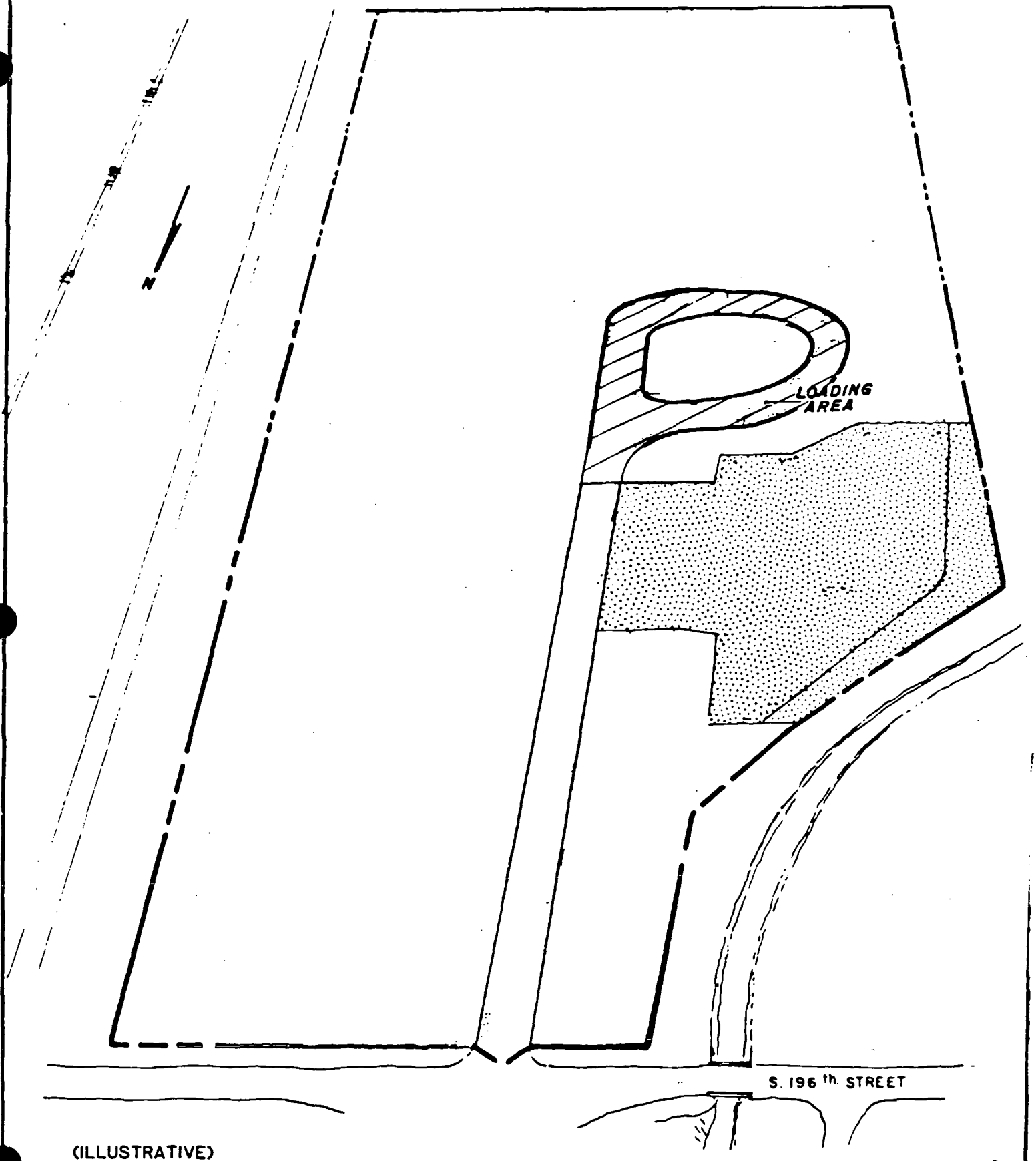
PROJECTED SITE CONDITIONS FOLLOWING...
BUILDING DEMOLITION
EST. TIME: 20 DAYS

EA0624

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.



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PROJECTED SITE CONDITIONS FOLLOWING...
DEMOBILIZATION
EST. TIME: 15 DAYS

EA0625

CHEMICAL WASTE MANAGEMENT, INC.
ENRAC DIVISION

WESTERN PROCESSING KENT, WA.

SECTION VIII CONTRACTOR'S QUALIFICATIONS

Chemical Waste Management, Inc. is a major operating division and wholly-owned subsidiary of Waste Management, Inc., one of the world's largest and most respected companies specializing in the orderly collection, processing and disposal of waste materials. Since its emergence as a publicly-held company in 1971, Waste Management, Inc. has grown to a leadership position within the industry from which it draws its name, with gross revenues of approximately $1 billion in 1983.

Waste Management's more than 150 North American operating divisions serve over 1,500,000 residential, commercial, industrial, and institutional customers in the United States and Canada. The company operates over 60 environmentally-secure sanitary and chemical waste landfills throughout the country. Our approximately 20,000 acres capacity ranks the company as the largest landfill owner/operator in the world.

The characteristics and magnitude of the Western Processing project will require the services of a firm which is experienced in dealing not only with hazardous waste in general, but which is also experienced in projects involving large scale excavation operations and in situations requiring a high degree of operational flexibility and creativity.

As the largest landfill owner/operator in the world, Waste Management has developed unmatched resources and experience in the areas of planning, engineering design, heavy equipment procurement, operation, and maintenance, and large scale excavation operations. The Western Processing project will require a company qualified in each of these areas; as a wholly-owned subsidiary of Waste Management, Inc., CWM-ENRAC is able to draw upon these resources and experience, and is able to present credentials that are unmatched within the waste disposal industry.

Chemical Waste Management, Inc. is the largest chemical waste transportation, processing, and disposal company in the United States. Our own fleet of over 700 chemical waste collection and transportation vehicles represents the largest such specialized fleet in the chemical waste industry.

This fleet includes specialized tankers and trailers, such as stainless steel, rubber, or epoxy-lined vacuum trucks and bulk trailers; van trailers for transporting drums; and specially designed container systems.

All of our transportation equipment and operators are D.O.T. certified including the necessary paperwork and records, driver training, testing, and annual health exams, etc.

In addition to this transportation capability, Chemical Waste Management currently owns and operates a network of 21 permitted advanced chemical waste analysis, treatment, processing, storage, and disposal facilities throughout the country.

This network of facilities enables us to serve industry from coast to coast. We have transported and disposed of waste from all of the 48 contiguous states and Alaska. These capabilities make Chemical Waste Management, Inc. the nation's largest transporter and disposer of chemical wastes, having more disposal capacity and secure facilities than any other company currently providing transportation and disposal services to industry.

Our company laboratories employ highly-trained staffs of chemists, technicians, and engineers to perform the analytical work, which determines the most appropriate and environmentally secure treatment and disposal methods. Currently, we employ Ph.D.'s in Chemical Engineering, Biochemistry, and Geology. In addition to Chemical Waste Management, Inc.'s staffing, Waste Management, Inc. provides support services for field operations through its Environmental Management Division at the corporate office which employs twelve degreed professional engineers. Combined, Chemical Waste Management, Inc.'s regular and support staff represent numerous years of professional experience in the specific field of hazardous and solid waste management.

ENRAC - ENVIRONMENTAL REMEDIAL ACTION DIVISION

With the passage of the Resource Conservation and Recovery Act (RCRA) in 1976, Congress manifested the nation's heightened awareness and concern over the increasing problems associated with hazardous waste disposal. While the legislation was designed primarily to set standards for future management of hazardous wastes, there was grave concern over the practices of the past. In 1978, in order to provide solutions to past disposal problems when they surfaced through discovery, violation, or pollution incidents, Chemical Waste Management, Inc. mobilized clean-up teams experienced in all phases of hazardous waste identification, analysis, handling, transportation, treatment, and disposal. Since there was no moving force or national governmental program at that time, our mobilization was accomplished on a regional and facility-specific basis, with clean-up response activities and capabilities being provided on a localized or regionalized basis. During this period of time, Chemical Waste Management, Inc. handled literally hundreds of clean-up projects varying in size from a few drums to several thousand tons of hazardous waste, responding to every type of hazard and/or problem imaginable and requiring the use of every bit of experience and discipline that CWM, or the industry, could provide. We continued to successfully perform in this fashion until early 1981 when Congress passed and implemented the "Superfund" legislation. It was at this time that Chemical Waste Management, Inc. formed the Environmental Remedial Action Division, appropriately called ENRAC.

Our purpose behind this was threefold: (1) to consolidate all of our past knowledge and experience into one organization that would specialize in the complicated and difficult field of site mitigation, (2) to provide CWM a single pool of people and resources that would be controlled and directed from one central management point, and (3) position CWM to be able to respond at the federal and state level nationwide with capabilities unmatched in the industry. This approach enabled CWM to continue to expand its knowledge and experience in the areas of hazardous waste site mitigation and remedial response.

Our current ENRAC facilities are located at strategic points around the country. This is one of the key reasons behind our past achievements.

ENRAC, as a division of Chemical Waste Management, Inc., accepts commercial projects under a professional code of conduct promoting confidentiality. The sensitivity of our projects arises out of the nature of chemicals with which we deal. The processing and disposal of hazardous and possibly carcinogenic substances is usually met with strong public opposition. In such circumstances, the generator may be undeservedly subjected to ruinous publicity.

For these reasons, we refrain from publishing a list of our client's names. We believe that an accurate description of the projects performed (along with their locations) should provide sufficient basis on which to judge our level of expertise in the cleanup and disposal of hazardous waste.

Raymond W. Bock
Director, Project Development, ENRAC

The following list is representative of the remedial actions which Chemical Waste Management's ENRAC Division has completed.

PROJECT NAME & LOCATION	OWNER NAME & ADDRESS	COST OF WORK (IN THOUSANDS)
BARKER CHEMICAL Site Closure Dallas, Texas	USEPA Region VII	780
GENEVA INDUSTRIES Site Closure Houston, Texas	USEPA Region VII	1,550
PINE BLUFF ARSENAL Drum and Soil Removal Pine Bluff, Arkansas	U.S. Army Corps of Engineers	835
ROGERS LABORATORIES Emergency Drum Removal Milwaukee, Wisconsin	USEPA Region V	250
LAKE COUNTY FOREST PRESERVE Buried Drum Location & Excavation Lake County, Illinois	Lake County, IL	180
ENVIRO-CHEM Classification, Repackaging, and Removal of Drums and Contaminated Soils Zionsville, Indiana (in progress)	Generator Sponsored	2,900
NIROP Drum Sampling, Analysis and Removal Fridley, Minnesota	U.S. Army Corps of Engineers	540
Seymour Recycling Center Seymour, Indiana	Commercial Account	7,700
Closure of PCB Oil Lagoon Davenport, Iowa	Due to sensitivity of many of our projects, we do not list client's names	1,800
Collect & dispose of DDT Materials in Dept. of Defense locations	Department of Defense Battle Creek, Michigan	1,800

PROJECT NAME & LOCATION	OWNER NAME & ADDRESS	COST OF WORK (IN THOUSANDS)
Clean-up of hazardous waste dumpsite Tacoma, Washington	Commercial Account	1,600
Remove and dispose of mercury decontaminated soil Ponce, Puerto Rico	Commercial Account	1,000
Disposal Site Port Arthur, Texas	Commercial Account	1,000
Clean-up of chlorinated organic waste disposal site Beaumont, Texas	Commercial Account	1,000
Classification, repackaging and removal of drums Zionsville, Indiana	USEPA Region V Chicago, Illinois	800
Clean-up of pesticide contaminated soil 3 sites, California	Commercial Account	750
On-site drum repackaging site stabilization Arctic Circle, Alaska	State of Alaska	700
Clean-up and closure of hazardous waste lagoon Luling, LA	Commercial Account	465
Clean-up of drum storage site Seymour, Indiana	Commercial Account	460
Contaminated Soil Removal Omaha, Nebraska	Commercial Account	400
Excavate, classify, segregate drummed material at abandoned drum site Gary, Indiana	USEPA Region V Chicago, Illinois Superfund Cleanup	350
Clean-up of chemical waste dumpsite Houston, Texas	Commercial Account	350

PROJECT NAME & LOCATION	OWNER NAME & ADDRESS	COST OF WORK (IN THOUSANDS)
Clean-up of Drum Disposal Site Hayward, California	State Health Department State of California	350
Clean-up of Chemical Waste Dumpsite Puerto Rico	Commercial Account	300
Clean-up of Arsenic & Pentachlorophenol Soil Stockton, California	Commercial Account	300
Clean-up and demolition of chemical supply warehouse/fire Dallas, Texas	Commercial Account	250
Clean-up & Demolition of Chemical Plant/Fire Childersbery, Alabama	Commercial Account	250
Clean-up of chemical waste dumpsite Montgomery, Alabama	Commercial Account	200
Clean-up of arsenic contaminated building Sacramento, California	Commercial Account	200
Clean-up of DDT Contaminated Soil Riverside, California	Commercial Account	200
Closure of Hazardous Waste Lagoon Springfield, Missouri	Commercial Account	150


Chemical Waste
Management
Inc.